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EXCLUSIVE FIRST TEST—page 56

Mugen MBX-4RR



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TRACK TESTS HPI Nitro MT
Cross Fire Force CF-01
Yokomo MR-4 BC and MR-4 MT



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ON THE COVER (clockwise from top): Mugen's all-new MBX-4RR picks up its front end; the Yokomo MR-4 MT digs in; a Cross Fire Force CF-01 moves out; and HPI's Nitro MT gets on the gas. All shots by Walter Sidas.

track tests



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Exclusive!

Mugen MBX-4RR

A new Y2K Worlds contender.
by Steve Pond



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HPI Nitro MT

It isn't an electric RS4 MT conversion.
Heck, it isn't even an RS4.
by Peter Vieira



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Yokomo MR-4 BC and MR-4 MT

The Super Dogfighter 2 and a super play truck, too.
by Peter Vieira



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Cross Fire Force CF-01

Will this innovative open-wheeler rekindle the flames of F1?
by Greg Vogel



Second in the B-main ... and loving it

Everybody wants to win. That's the goal in racing, no matter which level you compete at, no matter how much you profess to be doing it "just for fun." You want to win. Winning is the most fun. Or is it?

I don't usually win (all you guys who race at Madness or Xtreme in Connecticut are thinking "We know!" right now; I can hear you), but this past weekend, I was *on fire*. Thanks to a wide-open track layout and a dialed Team Losi Triple-Xt, I was unbeatable in my stock truck qualifiers and won all three from tone to tone. The race would start, I'd take the lead after the first turn and never look back. It was fun the first time and funny the second time, but by the third heat, I felt like a sandbagger, which wasn't fun. Then it was time for the A-main. Ordinarily, I'm stoked just to be in the A-main, and even if I tank and come in last, I'm glad to say I was in there. But this time, as I sat at the front of the grid as top qualifier, I was just tense. "Don't blow it," I told myself—a thought that always seems to send a subliminal message that says, "Dude, you're gonna blow it!" At the starting tone, I rolled away and proceeded to make more mistakes during that race than I had in all three of my quals combined. I eventually gave up the lead with less than half a minute left in the race, and although I still took second place in an A-main full of good drivers—a better finish than I had in any race last season; I wasn't happy about it. I felt like a chump. I remembered B- and C-main wins that made me happier.

So what's the moral of this little story?—don't win? Of course not! The moral is this: enjoy the chase. When you qualify last for the B-main but work your way into the top three, that's awesome. When you're on the bubble for the A-main and squeak in with a killer third qualifier, you're the man. Who cares if you never make it out of last place in the Main? I actually feel kind of sorry for guys like local Kawada/Associated hotshoe Mike Dumas, who wins every weekend. It must be nerve-racking to always be holding off a field of guys who are gunning for you. It must be sad when you can't feel good about second place in an A-main. Believe me, I wish I had Mike's skills, but that doesn't mean I'm not having a blast as a mid-pack driver trying to work my way up. It's all about the chase.

I'll see you next month. I have to go practice.

Peter Vieira, Executive Editor

Nobody can win 'em all—but these guys win quite a few.

RADIO CONTROL car action

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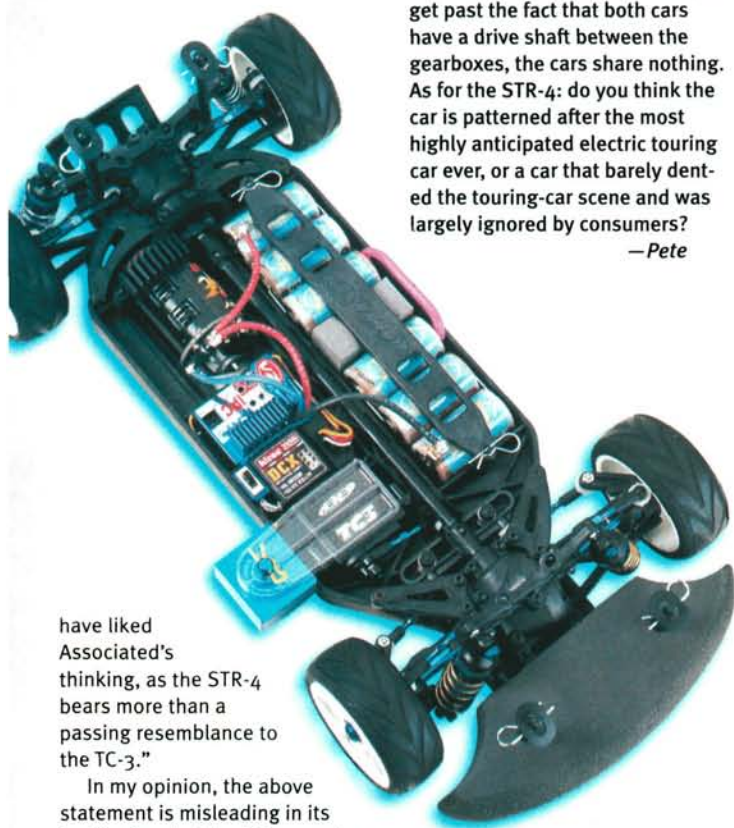
100 East Ridge, Ridgefield, CT 06877-4606, USA

Associated TC3: Chicken or Egg?

I'd like to comment on this statement from Paul Onorato's review of the MRC/Academy STR-4 in the April 2000 issue: "Academy must

resemble one another, yet we don't refer to their designs as "blatantly borrowed" from Yokomo or HPI). When Associated decided to build a shaft car instead of a belt machine, comparisons to Tenth Tech were inevitable. But once you get past the fact that both cars have a drive shaft between the gearboxes, the cars share nothing. As for the STR-4: do you think the car is patterned after the most highly anticipated electric touring car ever, or a car that barely dented the touring-car scene and was largely ignored by consumers?

—Pete



have liked Associated's thinking, as the STR-4 bears more than a passing resemblance to the TC-3."

In my opinion, the above statement is misleading in its implication that the TC-3 was the influencing design for MRC's car. In reality, Associated Electric's blatantly borrowed the TC-3 idea from a car made by Tenth Technology. Considering product development time, it is more than likely the Academy STR-4 was also "fathered" by the Tenth Tech design.

JON SCHWARTZ
Seattle, WA

I completely disagree with your comments about Associated. Tamiya has used a shaft drive to link the front and rear gearboxes since the '80s, and the refinement of a direct shaft/diff link through a bevel pinion gear and differential ring gear was perfected in 1/8-scale buggies long before Tenth Tech hit the scene. Face it: if you're going to build a shaft-drive touring car, the drive train is going to look a lot like the Tenth Tech system (another example: all dual-belt TCs

Better RTR Radios

I always see the Hitec Lynx AM and the Airtronics Rival Sport radios included with ready-to-run cars. These are the least expensive radios. Just once, I would like to see the Futaba Magnum Junior in an RTR combo because I've been spoiled by endpoint adjustments. Why can't the RTR guys pay 20 bucks more and get a better radio?

I bet more people would buy RTR cars. I never bought an RTR because their radios don't meet my expectations.

HOWARD CHEN
Glendale Heights, IL

Your comments hint at the decisions marketers must make when they launch an RTR kit. Prevailing wisdom suggests that the typical RTR buyer is a rank newcomer who will not understand or appreciate additional radio features, and such features will not sway his purchasing decision. More likely, the RTR buyer will be motivated by anodized parts, metal shocks, a pre-painted body and similar, highly visible upgrades. With that logic, the product managers spec the least expensive radio to trim the price of the kit (or free up funds for anodized pieces, chrome wheels, etc.). Your letter suggests a new breed of RTR buyer: experienced hobbyists who don't want to build. I can only wonder if there are enough like-minded hobbyists to change the shape of the RTR market, but I can offer this solution to your radio dilemma: why not ask the local shop owner if he'll swap the included radio for the one you really want? You'll have to pay extra, but judging by your letter, you're already prepared to pony up. It's worth a try.

—Pete

Safety First

I thoroughly enjoy your magazine and especially like "Pit Tips." However, I do have concerns about the "Cheap Paint Booth" tip in the April 2000 issue. This setup can lead to a very dangerous situation that could cause a fire or explosion.

Professional exhaust systems/booths are made with explosion-proof, spark-resistant motors, fan blades, housings, lights and light

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

EMAIL ADDRESSES:

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Kevin Hetmansk: kevinh@airage.com
Steve Pond: stevep@airage.com
Peter Vieira: peterv@airage.com
Greg Vogel: gregv@airage.com

covers. They also have fire-suppression systems built in, just in case something still goes wrong. There are reasons for this; paints (both the propellant and the finish) are often flammable, explosive and/or combustible. A spark from the fan motor or switch or an overheated lamp, could ignite fumes or paint. The oven-hood setup has none of the protective features required to minimize these risks. It is much safer to paint outdoors or in a naturally well-ventilated area with no spark- or flame-producing equipment anywhere in the vicinity. If you can smell paint fumes next to the gas furnace in the basement even though you're painting upstairs, you don't have enough ventilation. Reading and heeding the warnings on the paint cans is good advice; they're there for a good reason.

Thanks again for the great reading material. My only problem with the mag is that it comes only once a month!

GREG SCHICKEDANZ
Highlands Ranch, CO

Thanks for the heads up, Greg. Readers, if you use any type of overspray, unplug or disconnect it, and heed Greg's other warnings.

—Pete

DREAM JOB ALERT • EDITOR

We're looking for an enthusiastic, organized individual to join our RC Car Action group. This in-house position (Ridgefield, CT) requires knowledge of the RC car hobby, writing and editing experience, and the ability to coordinate schedules and meet deadlines.

Send cover letter and resume to:
Air Age Publishing
Manager, Human Resources
100 East Ridge
Ridgefield, CT 06877-4606
Fax (203) 431-3000
Email resumes@airage.com

BY CHRIS
CHIANELLI

SANYO 3000s ARE HERE!

Trinity releases Sanyo's NiMH super-cell



To hook up the new cells (or any pack), try using Trinity's new "Corally style" plugs. They're gold plated for zero voltage loss, and since they are attached directly to the cells, you get the convenience of connectors with the efficient routing of hard-wiring. You can get them in sets for one ESC and one battery, or one ESC and 10 batteries.

Trinity, 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; www.teamtrinity.com.



Panasonic deserves credit for reaching the market first with a 3000mAh, sub-C NiMH cell, but the biggest name in RC batteries is still Sanyo, and racers expect another performance pinnacle to be reached now that the legendary brand is packing a NiMH 3000 of its own. After three passes through the TurboMatcher with a discharge rate of 30 amps and cutoff voltage of 0.85 volt, we saw the following results. We've paired the numbers with a set of figures for Panasonic cells with Trinity's VIS-EXtra treatment for comparison.

	Sanyo 1	Sanyo 2	Sanyo 3	Panasonic
Run time (seconds)	361	367	366	382
mAh	3008	3058	3050	3183
Average voltage	1.084	1.088	1.106	1.076
Internal resistance	27	26	23	26
Milliwatt hours	3260	3327	3373	3183

We'll have a complete 3000 cell shootout in the next issue!

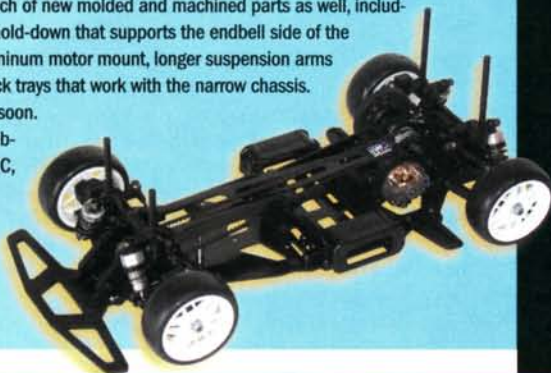
Kawada SV-10 Alcyon II

The original SV-10 is no slouch, but the Kawada engineers have done some tweaking and now have a "II" model for their efforts. The narrow optional chassis is now standard equipment, and the "V.O.L.T." side plates have been replaced by a conventional upper deck. There are a bunch of new molded and machined parts as well, including

a new motor hold-down that supports the endbell side of the can, a finned-aluminum motor mount, longer suspension arms and new stick-pack trays that work with the narrow chassis.

Look for a review soon.

Kawada; distributed by Mach 5 RC, 16625 Redmond Way, Ste. M, N. 298 Redmond, WA 98052.



DID YOU WIN our Triple-X Sweepstakes?

Sorry, but if you need to read this to find out, you already lost (one of those days, huh?). Don't be sad; we're always giving stuff away. Here are the lucky winners:

- **GRAND PRIZE**—RAY SUNIE, Hamilton, AL.
- **FIRST PRIZE**—KIMBERLY R. SHINN, Hannibal, MO.
- **SECOND**—JONAH GALLANT, Las Vegas, NV.
- **THIRD**—PHIL WHITFORD, Janesville, WI.

NEW OFF-ROAD RUBBER FROM PRO-LINE

Pro-Line needs no introduction; here are the details on the new shoes (left to right)

• **MASHER 2000.** My favorite. Now this is a monster truck tire! Soft M2 compound, dangerous-looking tread pattern, reinforced, authentic-looking sidewall design and high-density foam inserts combine to deliver hardcore traction (and looks) to any truck with 2.2 rims (which is just about every 2WD truck out there).

• **CRIME FIGHTER.** Who names these things? Pro-Line's latest 1/8-scale tire is supposed to be the hot setup for hard-packed and blue-grooved tracks. It features an all-new carcass design and diamond-shaped side tread. Firm foam inserts are included.

• **DIRT WORKS 2.2.** The newest all-purpose truck tread from Pro-Line looks like a worthy successor to the Dirt Hawg line; it combines scale appeal with long-wearing rubber. Foam inserts included.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; www.pro-lineracing.com.



THIS JUST IN!

Brian Kinwald has **WON** the **NORRCA Fuel Nats** with a **prototype Triple-XNT**. It's gonna be a **great summer** for gas truck racing.

Ladies
&
gentlemen,

PIT DUDE!

Schumacher's Pit Dude is more than just a car stand; he—*I* mean it—is also a battery jig, shock station and motor stand. Poseable arms not included (or sold separately, for that matter).

Schumacher, 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; fax (813) 889-9593; www.racing-cars.com.

And you thought the
POCKET FISHERMAN
was versatile!

TEAM LOSI ANNOUNCES NITRO TRIPLE-XT

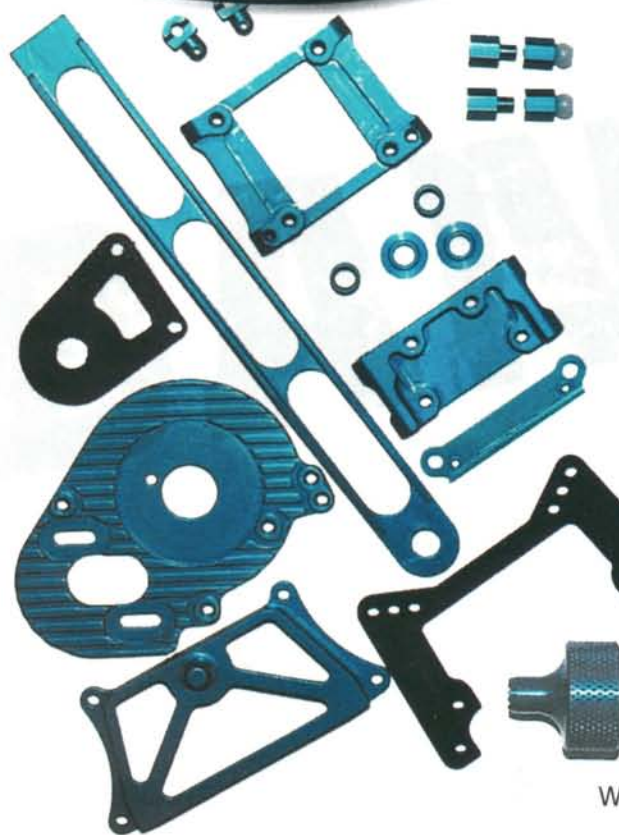
Actually, they're calling it the XXX-NT ("Triple-XNT"). Unfortunately, Team Losi had no photographs of this new truck to share, so I can't show you what it looks like, but here are its tech details:

- **Low-ratio 4.11:1 "stacked" transmission**
The new tranny is designed to keep its weight low and to the rear of the chassis for better traction and acceleration. The 4.11:1 ratio allows a much smaller spur gear to be fitted, and a double-disc slipper clutch is provided.
- **Heavy duty, large-diameter differential**
Losi built the new diff just for gas racing; it features large-diameter, carbon-steel polished rings and hardened-steel alloy outdrives, and spring-steel tension washers.
- **Disc brake**
At last! Losi doesn't offer much detail here but does say that the design is "ingenious" and uses a four-lobe hub (instead of a hex) to decrease wear and chance of failure.
- **Thick, aircraft-aluminum chassis**
How thick? Try 3.18mm on for size. I've seen 1/8-scale buggies with thinner chassis.
- **Fully enclosed battery box and receiver cover**
Well, that kind of says it all, doesn't it?
- **Adjustable, machined-aluminum engine mounts.**
No more preset mesh; it was a good feature, but I don't think racers will miss it.
- **Multi-position servo mounting**
Hmm ... very interesting: the steering servo can be positioned forward or backward to alter weight bias, and all popular servos will fit.

SOUNDS HOT! The Triple-XNT will accept engines with or without pull-starters, and yes, you will be able to run a slide carburetor (or rotary, if you like); Losi promises its machined/molded linkages will offer total precision and adjustability. Look for the new truck in August.



a la **TEAM Kinwald**



TK5008	Blue Aluminum Battery Strap	\$19.99
TK5009	Blue Aluminum Lower Front Bulkhead	\$29.99
TK5010	Blue Aluminum Upper Servo Brace	\$29.99
TK5011	Blue Aluminum Rear Body Mounts, 1 Pair	\$17.99
TK5012	Blue Metal Flake Graphite Front Shock Tower	\$15.99
TK5013	Black Kydex Transponder Mount	\$2.99
TK5014	Blue Aluminum Shock Bushings, Front And Rear	\$7.99
TK5015	Blue Aluminum 0 Degree Rear Pivot Blocks	\$29.99
TK5016	Blue Aluminum 2 Degree Rear Pivot Blocks	\$29.99
TK5017	Blue Aluminum Servo Mounts, 1 Pair	\$19.99
TK5018	Blue Front Brace With Sway Bar Mount	\$11.99
TK5019	Blue Adjustable Rear Sway Bar Mounts	\$14.99
Uses Losi sway bar wires. Adjustable to easily change wire length to fine tune your handling without changing the wire diameter.		
TK5020	One Piece Rear Wing Clip, 3 Pieces	\$4.99
Special long blue clip that goes through both the rear wing mounting posts.		
TK5022	Blue Aluminum Motor Plate, Same As In Kit	\$10.99
TK5023	Blue Aluminum Heatsink Motor Plate	\$25.99
TK5024	Blue Aluminum Screw Kit	\$18.99
TK5025	Blue Aluminum Axle Bearing Spacers, 4 Pieces	\$9.99
TK5026	Blue Aluminum Rear Arm Brace	\$8.99
TK5027	Blue Aluminum Slipper/Shock Wrench	\$21.99
Allows slipper adjustments without removing the rear tire. Tightens shock mounting nuts without scratching shock body.		
TK5028	Blue Titanium Tie Rod Set	\$26.99

TRINITY

www.teamtrinity.com

Who's in the mood for Ti?

Titanium and magnesium chassis from Killer Bee

OK, we've all seen aftermarket chassis for the HPI Nitro RS4 before. But these are different; instead of being machined from 6061 or 7075 aluminum, these Killer Bee chassis are slabs of titanium (the darker chassis) and magnesium (the lighter one). The mag. chassis is lighter, too—just 89.6 grams—and still stiffer than the stock Nitro RS4 chassis. But if it's maximum strength you're after, the titanium chassis is what you want. It's a little porky at 217.5 grams, but man, is it rigid! I had a hard time slightly bending the bare chassis, and believe me, I'm no weakling (short, yes; weak, no).

Killer Bee Racing, 130 Riverview Ave., Woodbridge, Ontario, Canada L4L 2L6.



Basement RC!

Check out R/C Club's cool 1/24-scale cars—perfect for racing indoors on rainy days. These miniature RC vehicles can run on carpet, linoleum or any other surface inside or outside your home. Heck, these things are so small they could be raced on a kitchen table! What sets the R/C Club cars apart from other 1/24-scale RC cars is that they're true 1/24-scale models with impact-resistant ABS bodies featuring separately molded chrome accents. All of the R/C Club cars have the same fully proportional electronics, but the chassis dimensions and tire sizes vary from model to model. Several car types are available, including the Rover Mini Cooper, Fiat Abarth and Renault Alpine (shown here). The cars are sold RTR and include a 27MHz pistol-grip, 2-channel radio, steering servo and reversing ESC. The cars also boast detailed, hard-shell bodies with two-color paint jobs! That's a lot of stuff for about \$149.

Microstuff, 304 N. Wayne Ave.,
Fullerton, CA 92833; (714) 680-0215; www.microstuff.net.



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9 gold plated contact points on each connector produce a tight, super low resistance connection. Designed for use with wire up to 12 awg!



RC5021 2-Male, 2-Female Connectors
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RC5021B 2-Male, 20-Female Connectors
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TRINITY

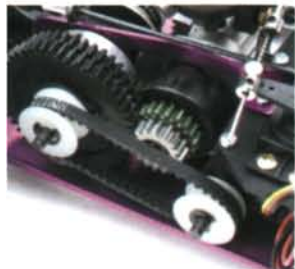
ANOTHER RTR NITRO TC TO TOP 50? DURATRAX NITRO STREET FORCE

Everybody has heard of DuraTrax's "Maximum" line of 1/10-scale RTR vehicles, and the 1/8-scale Axis and Nitro Quake RTRs are popular ways to hit the dirt in a hurry, but DuraTrax had yet to offer a pavement pounder—until now. The Nitro Street Force is the latest DuraTrax RTR, and like the others that came before it, it's packed with features. Here's the shortlist:

- 2.5mm chassis
- front and rear ball diffs
- tuned pipe and manifold;
- threaded-aluminum shock bodies
- 2-speed tranny
- Velocity .15 engine
- fiberglass disc brake
- full bearing set

You also get 12 AA batteries for the transmitter and onboard radio gear, a factory-painted, two-color body, fuel bottle and glow starter. DuraTrax also plans to offer a full range of hop-up parts, but even in stock trim, the Nitro Street Force is expected to top 50mph. Sounds as if DuraTrax is looking for a drag race with the Traxxas Nitro 4-Tec!

DuraTrax; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008.



THUNDER'S INSIDE JOB

Team Orion Thunder Designs decal set

've seen graphics packages that turn one- or two-color paint jobs into works of art, but Team Orion's new Thunder Designs decals are something else. Sure, the designs are hot (this one is called "Lightspeed"), but what's really trick is

the way they're applied: they go inside the body—before painting! This means that they're protected against being scuffed and scratched, and they look like part of your paint job instead of

"floating" above it. Pretty cool.

Team Orion, 22601 La Palma, Suite 103, Yorba Linda, CA 92887; (714) 694-2812; fax (714) 694-2815; www.team-orion.com.



Wizard of Ozite

Trinity Circuit Killer Street Weapon conversion now available!

Remember my "Build your own Josh-mobile" teaser in the April issue? Here's the kit, which is waiting for you at the shop now. You get super-short, threaded front shock bodies and titanium-nitride shock shafts, new graphite shock towers (with love-it-or-hate-it sparkle finish), new rear hubs (they're actually TC3 hubs!), a swaybar and trick bulkheads on which to mount the new shock towers (the X-brace and blue standoffs support the rear tower). Speaking of blue stuff, Trinity also supplies anodized hardware to complete the conversion, which will hook up your Losi with Josh Cyrul's Cleveland-winning setup. Swabby is converting his Street Weapon as I write; look for a test soon.

Trinity, 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; www.teamtrinity.com.



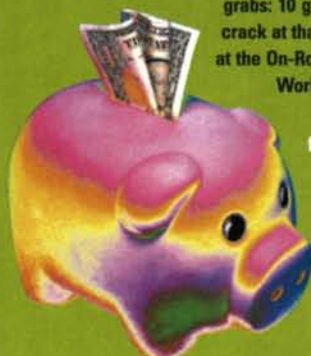
Get paid!

Megatech offers \$20,000 contingency program

I didn't even realize this was up for grabs until I saw Megatech's ad in the magazine! Maybe you missed it, too. Basically, a contingency program promises payment if you win a specific race using a certain product. In this case, it's Megatech SH engines, and there are 20 large up for grabs: 10 grand for first, \$7,500 for second and \$2,500 for third. If you want a crack at that dough, there's still time: just buy a Megatech SH engine and win at the On-Road Nats in Dallas, the Off-Road Fuel Nats in Missouri, the Kyosho World Gas Challenge in Detroit, or the Off-Road Worlds in Vegas.

NEWS FLASH: Chris Smith of San Bernadino, CA, just became the first Megatech money-maker with his second-place finish in the 1/8-scale Truck class at the Silver State Nitro Challenge. That's \$7,500 in his pocket! Needless to say, his burgers, gas and hotel for the weekend were pretty well covered.

Megatech engines are distributed by America's Hobby Center, P.O. Box 829, North Bergen, NJ 07047; (201) 662-8500; fax (201) 662-1450; www.megatechrc.com.



Win a \$500 gift certificate from DuraTrax! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids), and a brief description, to Readers' Rides, *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free *RC Car Action* decal sheet and will be eligible to win a \$500 gift certificate from DuraTrax in the "Readers' Rides of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. Good luck!

Readers' Rides

Ryan W. Perry Batmo-thing Scottsdale, AZ

This "Batmobile" was originally purchased from a toy store, but Ryan stripped and gutted it to make a custom chassis. The car now features a D3 8T double motor, a 2000 battery pack, a Novak Cyclone ESC and blue foam tires. Ryan describes it as "ridiculously overpowered" and "geared to the moon."



Larry and David Herrett Traxxas Nitro Sport RTR Columbus, OH

Larry and his son David shared the fun of building and driving this car and created the unique photography together, too. The car is mainly stock, except for the Pro-Line Sand Paw tires that they use in snow (not shown).



Brian Reinhart Tamiya King Hauler and Box Trailer Elkhart, IN

Brian, a Coca-Cola memorabilia collector, modeled this custom paint job after a Christmas television commercial. Since this photo was taken, Brian has added a Tamiya light kit, and he is also trying to figure out how to equip it with Christmas lights.



Stephen Bush OFNA Worlds GT Plant City, FL

This buggy runs with an O.S. RZB .21 engine, while the exhaust is vented through a CVEC tuned pipe. Steering and throttle/braking are handled by Futaba 9292 high-torque servos that receive their signals from a Lynx FM radio. OFNA Mini-Pin tires keep the car planted.

Readers' Rides

Abelardo S. Foronda Team Losi Triple-X

Pasig City, Philippines

Hop-ups on this buggy include RPM nylon ball cups, Pro-Line wheels and Pro-Line Bow Tie rear tires. It's also equipped with a Futaba 9303 steering servo, a modified Tekin 411P2 ESC, a Tamiya 17T single armature in a Trinity D3 motor can. To finish off the project, Abelardo hooked up his gear with Deans Ultra plugs and 12-gauge Wet Noodle wire.



Tommy Dang Yokomo MR4-TC

Houston, TX

Panasonic 300NiMH batteries and a Trinity D4 13x2 motor propel this cool-looking car that features a Protoform Dodge Stratus body. It's also equipped with a graphite chassis, Yokomo tuning springs and a Novak Dually ESC.

Judd Stauber Traxxas Stampede

Allison Park, PA

This truck features a K&J 2WD steel-tube chassis and front bumper, DuraTrax shocks with Traxxas internals, a Novak Rooster ESC and Robinson Racing gears. A SpeedGem 2 Quartz 19T double motor provides the power, while Andy's custom-painted body makes this truck a looker.



Austin Burns HPI RS4 Sport

Urbandale, IA

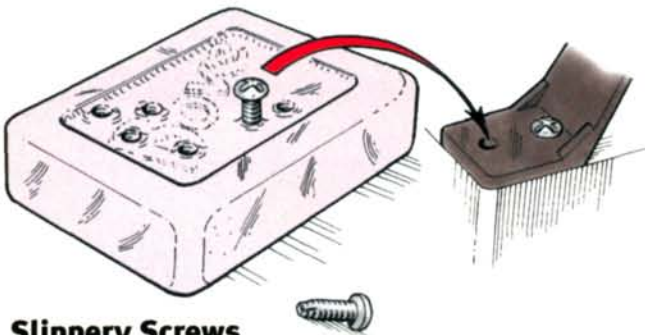
This sleek-looking car is equipped with an LRP Super Sport speed control, an MPI servo, an Airtronics receiver and an Orion modified motor, HPI low-profile tires and Pegasus rims. The shell features custom light covers, a BRP spoiler and an RPM Fat Boy exhaust pipe.



Pit Tips

BY JIM NEWMAN

Radio Control Car Action will give a 6-month subscription (or extend an existing subscription) to the author of each idea used in "Pit Tips." "Top Tip" winners receive an OFNA Z-10 Rally kit. All published "Pit Tip" authors receive an OFNA yo-yo. Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one nor return unused material.



Slippery Screws

Keep a bar of soap handy when assembling kits with difficult-to-turn self-tapping screws; the soap is an excellent thread lubricant, and it won't attract dirt the way grease would. [email]

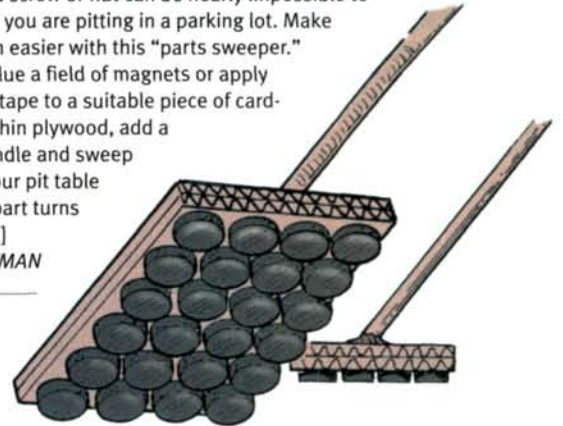
CHRIS KOSKOWSKI

Nut Finder

A dropped screw or nut can be nearly impossible to find when you are pitting in a parking lot. Make the search easier with this "parts sweeper."

Just hot-glue a field of magnets or apply magnetic tape to a suitable piece of cardboard or thin plywood, add a dowel handle and sweep around your pit table until the part turns up. [email]

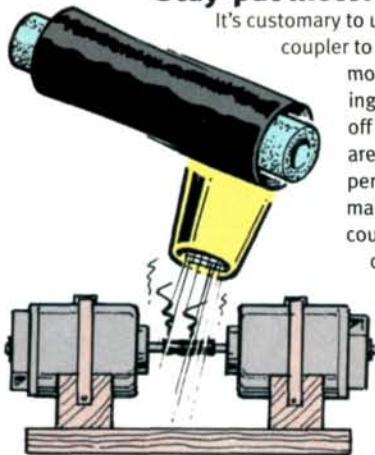
TIM HOFFMAN



Stay-put Motor Coupler

It's customary to use a piece of fuel tubing as a coupler to link a new motor to a slave motor for break-in, but the tubing can twist over itself and pop off when breaking in motors that are very "tight," such as high-performance stock motors. To make a stronger coupler, slip a couple of layers of heat-shrink over the fuel tubing; the new "laminated" coupler will grip tighter and won't twist off.

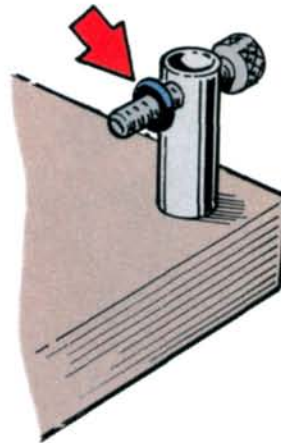
JACK STAHL
Baltimore, MD



Discharge Tray Contact Keeper

After a long trip to the track, you may find your discharge tray's threaded contact pins have vibrated out and become lost in the recesses of your pit bag. You can prevent this by slipping O-rings, short segments of silicone wire insulation, or slices of fuel tubing over each contact.

TOM GAGSTETTER
Roanoke, VA

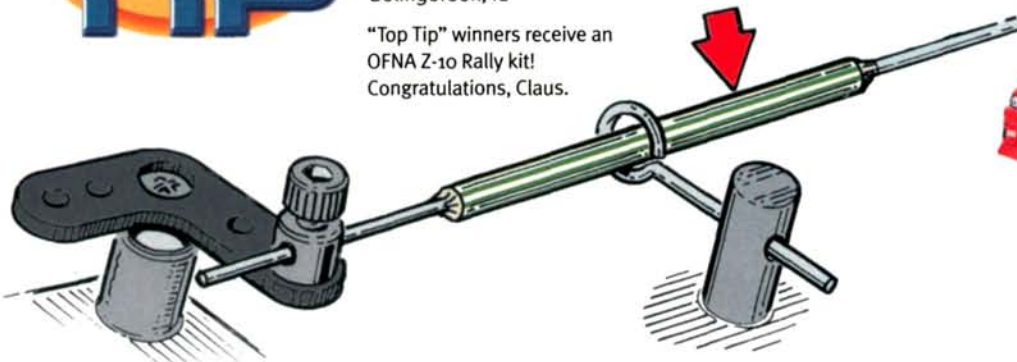


Glitch Stopper

The metal-on-metal contact between the brake arm and brake linkage of some nitro cars can cause radio glitches. To prevent this, insulate the linkage with a section of a hollow plastic coffee stirrer. It's a good preventive measure, and worth a try if your car is having glitch troubles.

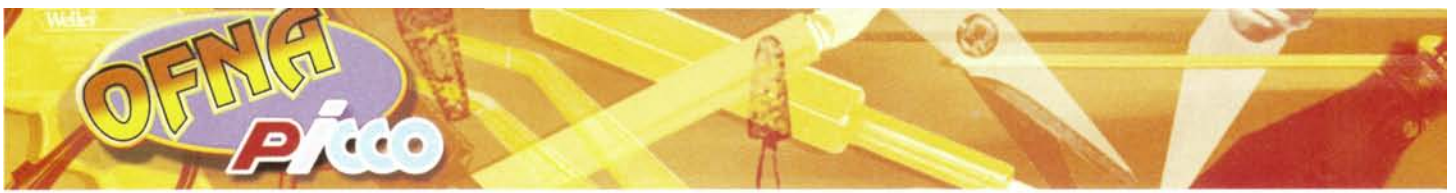
CLAUS RADDATZ
Bolingbrook, IL

"Top Tip" winners receive an OFNA Z-10 Rally kit! Congratulations, Claus.

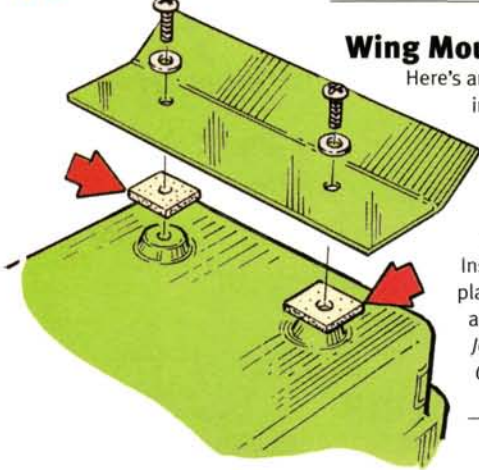


sponsored by





Pit Tins



Wing Mounting Made Easy

Here's an easy way to mount your touring-car wing. Use thin servo tape to stick the wing to the mounting posts. Once you're satisfied it's lined up properly, you can drill through the wing and posts for spot-on alignment. Install the screws with the tape in place; it will help to damp vibration and keep your wing tight.

JOHN P.M. HAUSER
Oak Park, IL



Pack Master

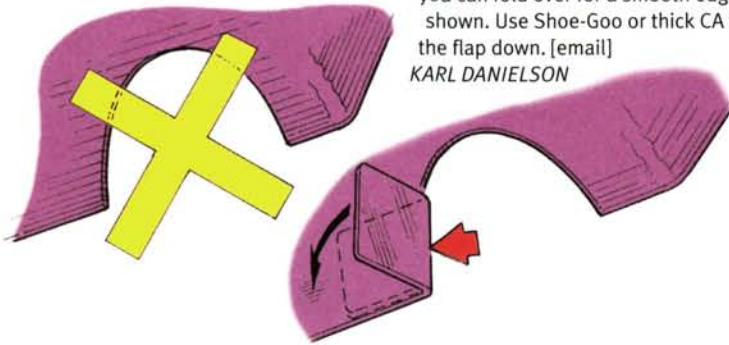
Hmmm ... is this pack warm because I just charged it, or because I just ran it? Stop the madness! Bread tags are handy for labeling charged and discharged packs.

Use a permanent pen to mark the tags.
ERIK NIELSON
Midland, MI

Chunk-proof Wheel Wells

Indoor touring-car racers: to prevent the rocker panels of your sedan body from chunking your foam tires, don't trim the wheel well all the way around. Instead, leave a flap you can fold over for a smooth edge, as shown. Use Shoe-Goo or thick CA to hold the flap down. [email]

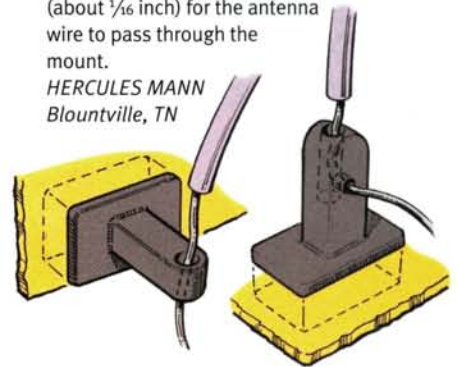
KARL DANIELSON



Instant Antenna Mount

A plastic servo mount can double as an antenna mount. You can attach it to a vertical surface and open up the screw hole to accept the antenna tube, or drill a new hole through the center of the block to mount the antenna on a flat surface. Drill a smaller hole (about 1/16 inch) for the antenna wire to pass through the mount.

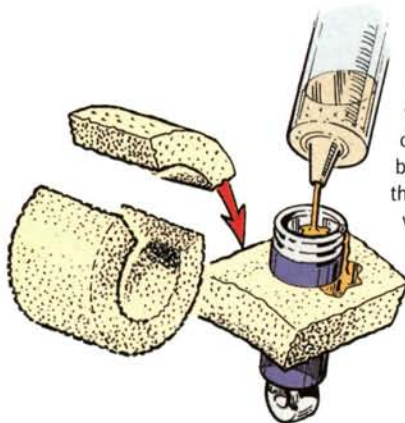
HERCULES MANN
Blountville, TN



No-mess Shock Filling

For neater shock filling, poke a hole through a piece of foam cut from an old off-road tire insert, then force the shock body through the hole up to the bottom of the threads. Any overflow you encounter while filling and bleeding the shocks will be absorbed by the foam.

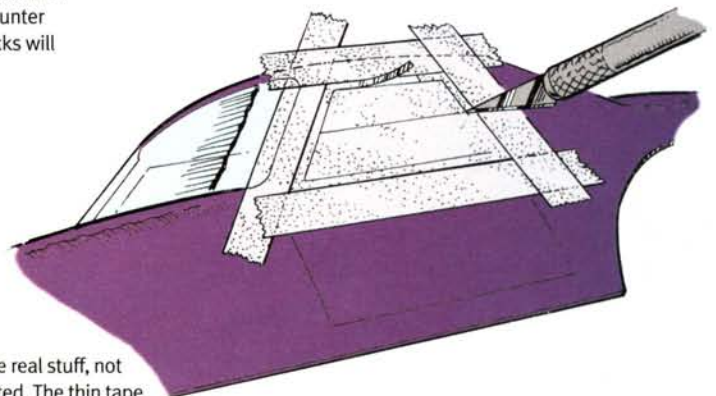
RALPH "MALPH" FINK
Quebec, Canada



Hard Body Detail Tip

When detailing "hard" bodies, use Scotch-brand tape (get the real stuff, not "Scotch-style") to mask fine details that are to be brush-painted. The thin tape leaves a very crisp edge, great for window moldings and panel lines. The tape is also low-tack, so it lifts easily without pulling up paint.

DONNY MASARELLI
Portland, OR



sponsored by



Troubleshooting

BY DEREK BUONO • ILLUSTRATIONS BY JIM NEWMAN

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

Drive Yokes Strip

I have a Traxxas Stampede and recently upgraded to a Trinity Sapphire (17 single). After I installed it, I started stripping out the drive yokes every couple of days. Did I do something wrong, or should I upgrade to the steel yokes? Is the motor simply too much for it? Please help. [email]
Darren Bemis

The steel yokes will certainly outlast the original plastic pieces, but make sure that the rest of the tranny can hold up to your Sapphire motor's horsepower. I'm guessing you don't have a slipper clutch (Traxxas now includes a slipper with the Stampede, but the early kits did not have them). The slipper clutch reduces wheelspin but also serves a more important function: it protects the transmission from the shock of sudden stops and starts, such as those that occur when the truck lands off a jump while you're on the throttle, or when you slam the truck from forward to reverse. If you have a slipper clutch, be sure it is set properly. How can you tell? Two ways. When you run the truck, you can set the clutch so it slips for about 2 feet before it fully engages. If you're in the workshop and need to set the clutch without running the truck, set it so that when you hold the rear wheels still, a firm push is needed to rotate the spur gear. It's easy to adjust the clutch; for less slip, just tighten the nut on the shaft that pokes out of the spur gear; for more slip, loosen the nut. The Sapphire is a popular motor for trucks like yours, and with a properly set clutch, you should have no problem running it in your Stampede.



NovaRossi Won't Cold-Start

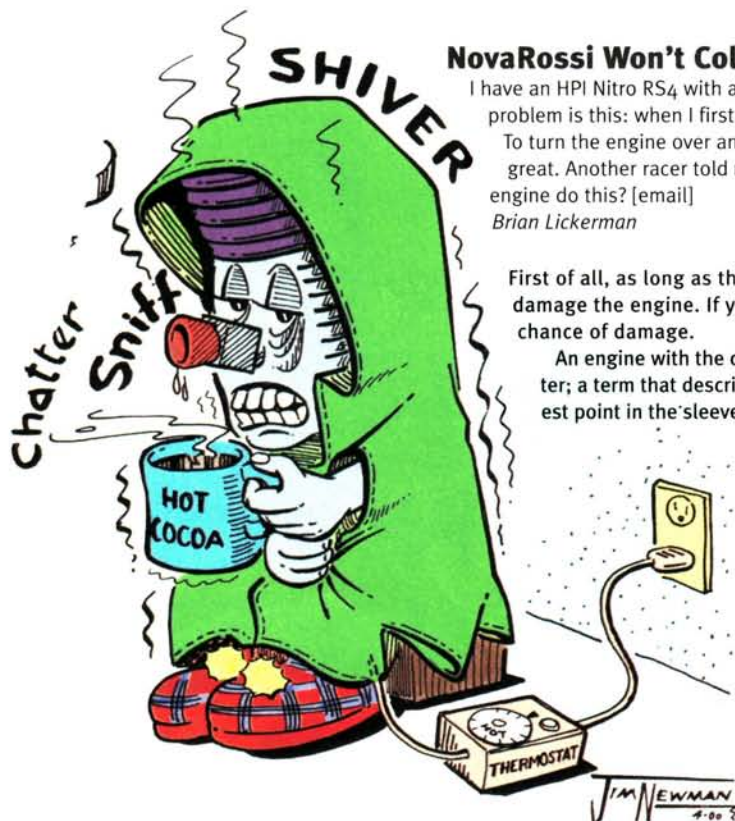
I have an HPI Nitro RS4 with a powerful NovaRossi engine that I plan to race at HobbyTown USA. My problem is this: when I first start the engine on my starter box, it's almost impossible to turn it over. To turn the engine over and warm it up, I have to remove the glow plug. After that, the engine runs great. Another racer told me that doing this would damage the engine. Is this true? Why does my engine do this? [email]
Brian Lickerman

First of all, as long as there's fuel in the tank when you turn the engine over, no way will you damage the engine. If you run the engine without any lubrication (fuel), there is a good chance of damage.

An engine with the correct fit between the piston and sleeve will stick at TDC (top dead center; a term that describes the position of the engine's crank when the piston reaches the highest point in the sleeve). Better engines such as your NovaRossi tend to have a particularly tight fit. As you've discovered, the parts "loosen up" as the engine warms up. This is because the sleeve expands as it gets warmer. As your engine breaks in, it will become easier to start when it's cold. I think your engine's behavior is normal, but let's examine some other possibilities.

You could have a problem with hydraulic lock (better known as "hydra-lock," or flooding), which occurs when there is more fuel in the cylinder than the engine can combust. Because the fuel cannot be compressed, the effect is the same as if you jammed a rock in the engine: it won't turn over. Loosening the plug to drain some fuel and reduce compression easily cures this.

Weather could also be a factor; if you're running in the cold of winter, you'll have a hard time firing up your engine, and the piston/sleeve fit will be even tighter than usual. Use a hair dryer to warm the engine before you start it.





RRP

ROBINSON RACING PRODUCTS

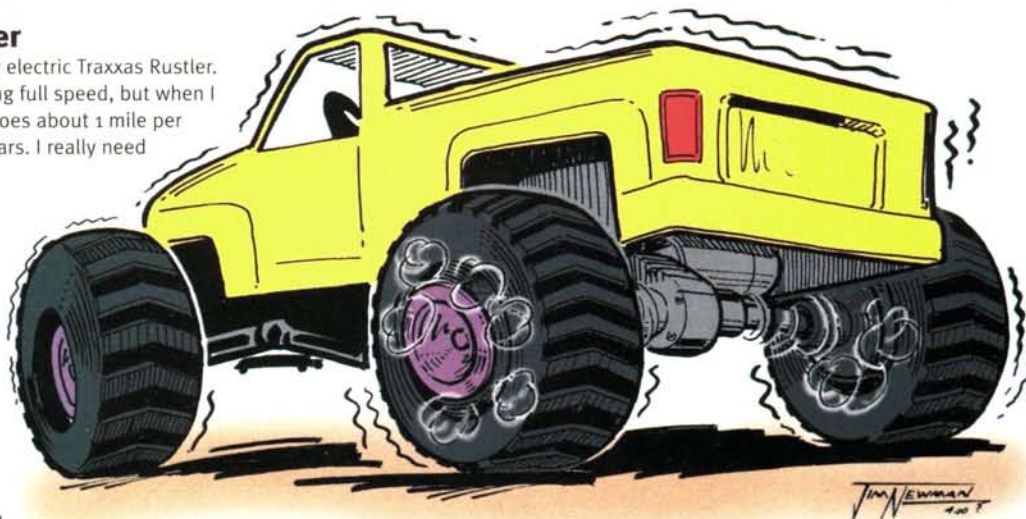
Troubleshooting

Slow-Motion Rustler

I am having a problem with my electric Traxxas Rustler. The motor seems to be reaching full speed, but when I put it down on the ground, it goes about 1 mile per hour. I think it might be the gears. I really need some help. [email]

Brian Marsh

Start with the slipper clutch (if your truck has one; if you purchased your truck in the last couple of years, it should). If you hold the truck still and apply throttle, does the spur gear spin without causing the shaft it's mounted on to rotate? If it does, your clutch is way too loose. If you've installed a ball differential in your car, check its tightness, too; it should not slip. The final possibility—and I have seen this many times—is tire slippage. If you didn't glue the tires on, they'll slip on the rims. You might not even notice it at first, but once some dirt has come between the tire and the rim, you can lose a lot of power to slippage, as you have discovered. Pop off the rims and tires, clean them up and glue on the tires with CA glue (Pro-Line, Team Losi and Trinity all make excellent CA meant for tires).



Unequaled Precision

RS4 Nitro Vented Flywheel



Precision CNC machined from light-weight aluminum, this vented flywheel blows air over the clutch shoes, improving performance and extending shoe life. RRP 1570 RRP 1571 Pull Start

ALL NEW ITEMS

Nitro Stampede Hardened Steel Spur Gear With Bearing



Precision machined one-at-a-time from a single piece of steel and then hardened this 65T spur will last and last. A sealed Ball Bearing is included. RRP 8565

TC3 Lite Aluminum Outdrives



Blue anodized and 40% lighter than stock ball diff outdrives. RRP 1475

Unsurpassed Reliability

Outstanding Performance

Kyosho Ultima Blue Lightened Slipper Kit



The rear plate is hard anodized to reduce wear and the front plate is color treated. The front plate is designed to hold the slipper pad forcing the pad to slip on the rear plate. When pad shows sign of wear just flip it over for a new surface. Metal parts are CNC machined for a flawless fit. RRP 7515

TC3 Ultra 48P Spurs

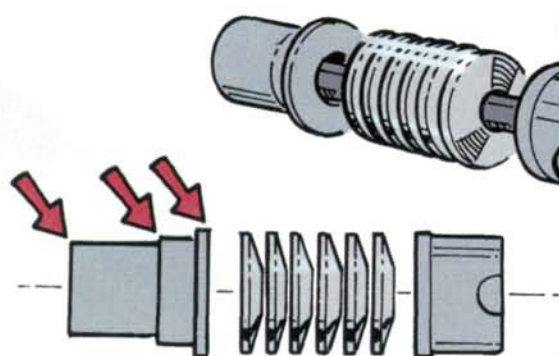


Tough, smooth and quiet. These new spurs are precision machined from heat-resistant plastic, to mesh flawlessly with our Pinions. 48P Ultra Machined Spurs are available in even numbers from 70T thru 80T. RRP 1670 - RRP 1680.

Nuclear Double-XT Diff

I have a Team Losi Double-XT Sport that keeps melting diff gears. I follow the instructions and set it properly, but it still melts. I'm using a Trinity Midnight stock motor, so it's not like I have a low-wind modified or something. I'm considering buying an HG aluminum diff gear to solve the problem. Is it worth the money?

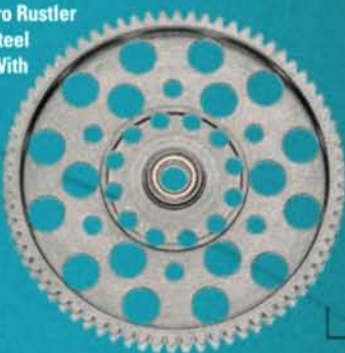
Josh Urbach
Aurora, CO



Just because you've tightened the diff according to the manual doesn't mean it's staying tight. Have you replaced the locknut that fits on the end of the diff screw? This nut should be replaced each time you rebuild the diff. Are you installing the thrust washers in the correct order? Are they all there? How does the thrust bearing look? Are all the balls in place? If all those parts seem to be in place and correctly assembled, check out the diff tube. Look for burrs that may be interfering with its fit in the outdrive; if you spot any, file them off. One more thing: make sure that all the bushings in your truck's tranny are well lubricated (better yet, install a set of bearings). That should fix your problem. By the way, the HG gear is nice but not a must-have, especially if you're using a stock motor. Give the plastic gear another shot. ■

Superb Quality

**T-Maxx/Nitro Rustler
Hardened Steel
Spur Gear With
Bearing**



Precision machined one-at-a-time from a single piece of steel and then hardened this 72T spur will last and last. A sealed Ball Bearing is included. RRP 8572

Rustler/Stampede/Bandit/Sport Nitro/Electric Sun Gears



CNC Machined from a from bar stock, these hardened, Sun Gears will last longer in your Traxxas machine. No serious racer should do without these gears. RRP 8500.

Intelligent Innovation

**Ultima GP-R
Hardened
Steel Idler
Gear**



Cut from solid steel stock, this gear is lightened and then hardened for super quiet precision and extra long life. RRP 7505

Thoughtful Design



**1999 World Cup and
National Champion**

"I only care about performance, and that's why I run Robinson Racing gears and slipper clutches exclusively."

— Richard Saxton

**ALL
NEW
ITEMS**



**Ultima GP/EP-R
Hardened
Diff Gear**



Hard anodized, precision machined aluminum diff gear. RRP 7500

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TRACK TEST

1/8-SCALE NITRO



EXCLUSIVE

Mugen MBX-4RR

Mugen's new Y2K Worlds' Contender by Steve Pond

About a year and a half ago, Mugen introduced the MBX-4—an 1/8-scale off-road competition buggy—to replace its aging Super Athlete. The MBX was a ground-up design that represented the latest technology. Flash forward to today: we're staring down the barrel of yet another new Mugen machine—the MBX-4RR! The relatively short time between the release of the original MBX and the new RR is undoubtedly because of the upcoming IFMAR 1/8 Off-Road World Championship to be held in Las Vegas, NV, later this year. This competition is always fertile ground for new releases, and Mugen has fired the first shot with the new RR.



DATA CENTER

VEHICLE TYPE 1/8 nitro-powered
4WD off-road buggy

BEST BUYER Intermediate to
advanced builders and engine tuners

KIT RATINGS (poor, satisfactory,
good, very good, excellent)

Instructions Satisfactory for
intended buyer

Parts fit/finish Very good

Durability Excellent

Overall performance Excellent

SPECIFICATIONS

SCALE 1/8

LIST PRICE \$799

STREET PRICE \$470

DIMENSIONS

Wheelbase 12.83 in. (326mm)

Width 12.1 in. (308mm)

WEIGHT

Gross (as tested) 122.4 oz.
(3,497.3g)

CHASSIS

Type 3.15mm channeled plate

Material 7075 aluminum

DRIVE TRAIN

Type Shaft-drive 4WD

Primary Clutch bell/spur

Drive shafts (F/R) Universal/
dogbones

Differential(s) 6-gear bevel (sealed)

Final drive ratio 10.95:1

Clutch 3-shoe centrifugal

Bearings/bushings Rubber-sealed
ball bearings

SUSPENSION

Type (F/R) Double A-arm w/pivot-
ball joints/lower A-arm w/adjustable
upper link

Damping Aluminum oil-filled shocks

WHEELS

Type One-piece plastic

TIRES

Type Pro-Line® 9011M2

ENGINE AND ACCESSORIES

(not included)

Engine Paris Racing/NovaRossi®
BX21/SBK

Carb 7mm slide

Pipe Rex 086

Fuel Trinity Monster Horsepower
20% nitro

RADIO GEAR (not included)

Transmitter KO Propo EX-1

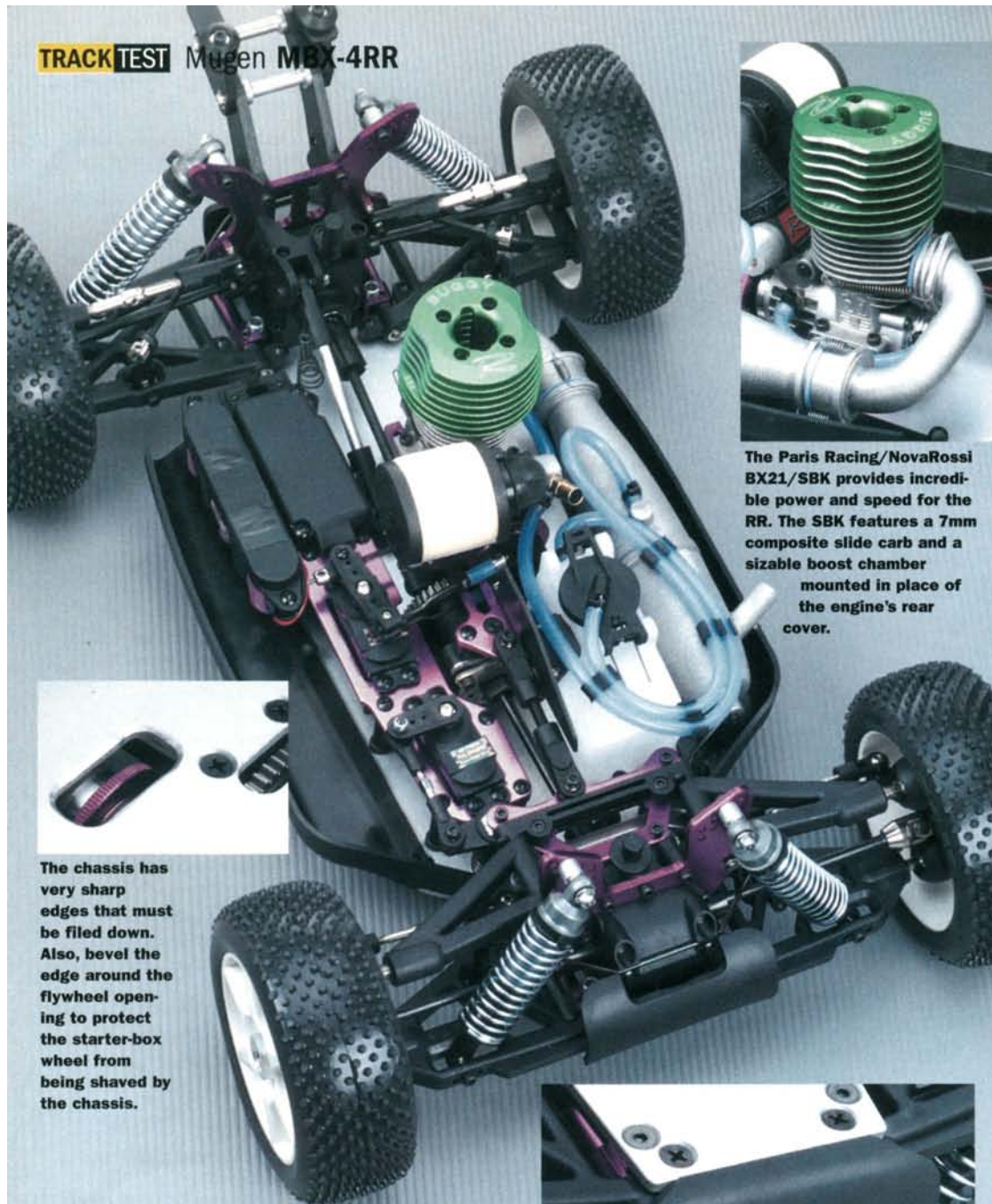
Steering/throttle servos KO Propo
2143FET/KO Propo 2144FET

LIKES

- Extras, including shock oil, diff fluid, hex wrench, fuel tubing, tubing clips and exhaust coupler, are all included.
- Suspension-geometry changes are quick to make and don't require any parts changes.
- Sealed bearings—nuff said.
- Excellent bang-for-the-buck ratio.

DISLIKES

- Fuel tank might not provide enough fuel flow.
- Sharp edges on chassis plate.



The Paris Racing/NovaRossi BX21/SBK provides incredible power and speed for the RR. The SBK features a 7mm composite slide carb and a sizable boost chamber mounted in place of the engine's rear cover.



The chassis has very sharp edges that must be filed down. Also, bevel the edge around the flywheel opening to protect the starter-box wheel from being shaved by the chassis.

The reinforcing rib on the leading edge of the front suspension arms contacts the front bumper and limits down-travel by about 1/4 inch. It's necessary to cut the front bumper as shown to ensure full suspension travel.



YOU'LL NEED ■ 2-channel radio w/two high-performance servos ■ 5-cell rechargeable receiver pack ■ 20- to 30-percent-nitro fuel ■ Fuel bottle (highly recommended) ■ Glow igniter ■ Polycarbonate-compatible paint ■ CA glue ■ Thread-locking compound ■ Starter box (for use w/non-pull-start engines)

COMPETITION		MUGEN MBX-4RR	KYOSHO MP-6 INTERNATIONAL	THUNDER TIGER EB-4
	Wheelbase	12.83 in. (326mm)	13.03 in. (331mm)	12.96 in. (329mm)
	Width	12.13 in. (308mm)	11.93 in. (303mm)	10.24 to 10.55 in. (260 to 268mm)
	Weight	122.4 oz. (3,497.3g)	113.3 oz. (3,212g)	120.5 oz. (3,420g)
	Diff type	6-gear bevel (sealed)	6-gear bevel (sealed)	6-gear bevel (sealed)
	Chassis	3.15mm channeled plate	2.5mm channeled plate	3mm flat aluminum plate
	Approx. street price	\$470	\$699	\$418
	Reviewed in	7/00	5/99	4/00

building & setup tips

The best buyer for the MBX-4RR is someone who has intermediate to advanced building and engine-tuning skills. This type of car can present too many challenges to those who lack reasonable experience. This is further compounded by instructions that lack the explicit detail an inexperienced builder would need for successful assembly—and it's a less-than-ideal English translation. The instructions do, however, provide detailed drawings and exploded-view diagrams that are sufficient to guide an experienced builder through to completion. The following steps are those I feel need a little more attention.

Step 1. Seal the differentials with a little silicone sealant. The provided gaskets contain diff fluid, but they can leak. Using silicone sealant in addition to gaskets provides extra insurance against having to remove the diffs to reseal them if they develop a leak. Also, be sure to "break in" the differentials by driving slowly in tight circles, especially if the diff gears feel a little tight. The diff gears can fail if they're not properly broken in.

Step 4. Trim the front bumper as shown in the photograph to the left. The bumper comes into contact with the new reinforcing rib on the front edge of the A-arms, and that limits front suspension down-travel by about 1/4 inch. Also, before you install any hardware on the chassis plate, file down the chassis' sharp edges and around the flywheel opening. Taking off the edge around the chassis' perimeter could save some skin, and smoothing the edge around the flywheel opening will prevent your starter wheel from looking as though it has been used to start a potato peeler.

Step 10. Insert the dogbone section of the front drive shafts into the universal joint only until it's flush with the inside edge of the U-joint. Installing it further in may make the drive shafts too short and might damage the U-joint when run-

ning at maximum steering angles. Use red Loctite® to secure the 4mm setscrews.

Step 11. Use pieces of fuel tubing to prevent the rear dogbones from sliding too deeply into the outer drive cups. The extra suspension travel may allow the outer drive cups to chew away at the dogbones when the suspension is at full extension.

Step 17. Check the fuel tank for proper fuel flow. I experienced flow problems with the fuel tank, so it would be wise to ensure that adequate flow is possible. First, blow through the included fuel line to see how much resistance is to be expected. Next, attach one end of the fuel line to the fitting for the fuel pick-up and blow through the tubing again. There should only be marginally more resistance. If it's twice as hard to blow through the fuel line once it has been attached to the tank, you may have a problem. Mugen is already aware of this happening in a few other preproduction kits and mine. I'm confident they're taking every step to ensure that the tanks in the production kits will function properly, but just take a second to double-check.

Step 21. Bend the brake linkage (as shown in the main photo on page 58) to improve alignment of the linkage rod with the brake arms. Failure to do this may cause enough drag on the brakes when applying throttle to hamper acceleration and top speed.

Step 25. The instructions don't specify the number of spring preload spacers to be used initially. I found that using 7mm (a combination of 5 and 2mm spacers) on the front shocks and 5mm on the rear was a good starting point.

Step 29. Wipe the wheels and tires clean with solvent before gluing. The new rims don't have the outer bead that can save you from a poor glue job. You may even want to roughen the gluing surface of the wheels for a little extra insurance.

• **Chassis.** The RR's chassis plate is made of 3.5mm channelled, die-cut 7075 aluminum plate that has very sharp edges. The chassis' bottom features countersunk screw holes front to back, except for the engine mounts' recessed screws which, just barely peek out from the chassis' surface. The RR's chassis is 6mm longer than the original MBX's—similar to the long-wheelbase chassis previously offered as an option on the original car. Early press releases indicated a narrower chassis than before, but except for length, its dimensions are the same.

• **Suspension/steering.** The most obvious changes are in the suspension. The original MBX featured unusual suspension-arm mounts that held the hinge pins at an extreme angle. The rear-suspension hinge pins were angled outward toward the rear, and the front pins were angled outward toward the front. The new RR returns to a more conventional design with the hinge pins more in line but still at a slight, though much less severe, angle than the original car's.

The RR's new standard suspension mounts are aluminum, which was an optional feature of the previous model. Also, setscrews now secure the hinge pins in addition to E-clips at both ends; this greatly reduces the chances of your losing an E-clip and ending your race. The front suspension arms are largely the same. The insides of the lower arms now accommodate the new hinge-pin angle, and a reinforcing rib on the lower arm's front edge improves durability. The upper arms, pivot-ball steering hubs and front anti-roll bar (2.1mm) are the same.

The rear suspension changes are the most significant: new lower suspension arms; a new rear anti-roll bar; and a new



Above: rear toe-angle adjusters are moved to the leading edges of the rear suspension arms to accommodate a new rear anti-roll bar. Rotating the turnbuckle-style adjusters quickly changes rear toe angle.



The longer chassis is shown here with the extended drive cup on the rear differential. The chassis is 6mm longer than the original MBX-4's. The RR's aluminum suspension mounts are standard. Setscrews secure the hinge pins in addition to E-clips. Another of the RR's new features are up- and down-travel limiters on all of the suspension arms. The screw outside the hinge pin adjusts down travel, while the inside screw adjusts up travel.

mounting location for the rear shocks and the rear toe adjusters. The suspension arms are now more symmetrical than the rear-swept arms of the previous car. This puts the wheelbase at 326mm—just 1mm longer than the original car. To accommodate a new, 2.6mm, rear

Paris Racing/NovaRossi BX21/SBK

During my previous experience with this engine, I found it incredibly powerful and reliable, so I bought another one! It's a bit of a bear to start for the first time because of the extremely tight fit between the piston and sleeve, but once it has been broken in, it's fun to watch it gobble up cars on the straightaways (just remember, there's always a turn at the end!).

Rex tuned pipe and header

The Rex® pipe and header are exactly the same as NovaRossi's, except for the gasket color and a different retainer-spring configuration, and I went with the Rex. A nice feature of these pipes is the coupler that joins the header and pipe. It's spring-loaded like the engine's coupler, making the joint more secure than if you used a standard flexible coupler—no more irritating "BEWHAAAAHH" when the flexible coupler fails and makes your engine sound like an aging weed-whacker!

KO EX-1 radio and digital servos

The EX-1 is one of the best radios, and it's well suited to this application. KO's® digital servos are amazingly powerful and quick—a perfect combination for 1/8 buggy racing.

Nuova Faor starter box

My Nuova Faor® starter box was designed for the MP-6, so I had to make some modifications. I like this starter box, particularly for its ability to turn over a tight, brand-new engine. It features a very large single motor run by an optional 12V battery that lasts a long time between charges and has plenty of power.

Trinity 20-percent Monster Horsepower fuel

Familiarity breeds confidence, and I've used Trinity® fuel for long enough now to feel very comfortable burning it in my precious NovaRossi engine. The engine runs well with anything in the 20- to 30-percent-nitro range, but I have plenty of 20-percent fuel, so that's what I used.

Lunsford titanium turnbuckles

The MBX-4RR has only five linkage rods, two of which are beefy 5mm turnbuckles for the rear. I was disappointed to find that the front steering tie rods were standard threaded rods, so I installed 3mm Lunsford® tie rods in their place. While I was there, I also installed a titanium link to connect the servo to the bellcranks.

Mugen 5-cell 900mAh receiver pack

If you expect maximum performance from your servos, five cells are a must for the receiver pack. The RR uses an in-line pack configuration, and Mugen makes a 900mAh pack (I think it is actually a 1000 pack) that will keep the receiver and servos running strong well past the finishing buzzer of a one-hour Main.

anti-roll bar, the toe-angle adjusters are at the front of the suspension arms. The rear shocks have also been repositioned for the same reason and are now attached to the rear of both the shock tower and the lower suspension arms.

The improved front and rear shock towers, options on the original car, are now standard. The front shock tower appears to be the same height; the rear shock tower is slightly taller. The RR now has 10 upper shock-mounting positions (four more than the previous design) that offer more ride-height and progressive-damping options. Speaking of dampers, there's also a difference in the shocks. The rear shocks are a whopping 10 to 12mm longer to allow greater suspension travel. The front shocks are the same length with new springs at all four corners. The kit includes a sizable bottle of 350WT shock oil (about the same as 30WT in the Losi line)—enough for two or three refills of all shocks.

The RR's steering system is a straight carryover from the previous and very effective model; it features a built-in, adjustable servo-saver.

• **Drive train.** We anticipated changes to the drive train's final drive ratio but it is actually identical to the previous buggy's except for a 14-tooth instead of a 13-tooth clutch bell. The major differences are the newly designed differential housings, which are now made of molded composite instead of aluminum. They are marginally lighter (for quicker acceleration) and easier to seal, so it is easier to prevent the diff fluid from leaking out. New to the RR kit is heavy silicone diff fluid—3000, 7000 and 1000WT—for the front, center and rear diffs, respectively.

The center diff transfers power via dog-bone drive shafts to the front and rear diffs. The rear diff has a longer drive cup to account for the 6mm increase in chassis length. Power is then fed to the wheels through universal-joint drive shafts in the front and dogbones in the rear. The RR retains the 17mm hex hubs at all four corners.

Two vented steel discs—one in front and one behind the center diff—handle braking. Combined with the independently adjustable brake linkage, the brake configuration allows brake bias, if that's what you want.

Supporting the whole drive system is one of my favorite new features—sealed bearings! I have been somewhat critical of Mugen and other 1/8 buggy manufacturers who don't use sealed bearings. The environment in which these cars run can be brutal. Dirt and debris can quickly foul the bearings, especially the wheel and outer diff bearings. The original MBX has shielded bearings, but the new RR has a full set of sealed bearings!

• **Wheels and tires.** The RR comes with newly designed wheels and a set of Pro-Line 9011M2 Multi-spike tires. The wheels' bead design is new; conventional wheels have an inner and an outer lip that form a groove into which the tires are mounted. The new wheels have only the inner lip.

• **Body and wing.** The RR's body resembles that of the original MBX. Because of my lack of ability in the painting department, I recruited the help of coworker Bob Hastings—our “go to” guy for last-minute paint jobs—to lay down the graphics on the new Mugen. The wing is a carryover from the MBX. It's durable, molded and has been proven to be able to withstand a beating. It's attached to a strong mount that I tested to the extremes of endurance.

PERFORMANCE

I first tested the RR at Xtreme R/C in New Milford, CT. Its newly designed track is much more suitable for 1/8 off-road buggies. It has been extended and the lanes widened to make room for the menacing nitro machines. I used this solo shakedown run to get the RR dialed in before I headed upstate for some wheel-to-wheel competition at R/C Madness in Enfield, CT. This is where a puzzling problem revealed itself—one that took two days to sort out.

My well-broken-in NovaRossi engine ran extremely well until I applied full throttle. It had the typical signs of a lean, high-speed-mixture setting, but with a twist: the engine ran up to speed without hesitation as long as I did not apply full throttle. At full throttle, the engine exhibited the same characteristics as it would have if being run with a lean, high-speed mixture. After opening the high-speed needle about 3 turns without seeing any improvement, the only option was to head back to the workbench for a more detailed diagnosis. I'll spare you the blow-by-blow, but it turned out to be a flaw in the fuel tank. Mugen was already aware of a problem with the tanks shipped with the new RR and had sent me a replacement—but the new tank had the same problem! A partial

blockage in the fuel tank's pick-up tube allowed only enough fuel flow to satisfy the engine up to about 3/4 throttle. At full throttle, the engine ran very lean, and before

I determined the source of the problem, I cooked three glow plugs and risked damaging my new NovaRossi engine. I speak of this problem in the past tense because with a call to R/C Madness, I knew that a fresh tank awaited me.

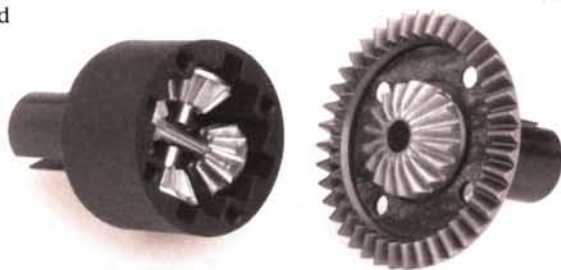
The RR uses the same tank as the original MBX. The only difference is a new filler lid with a canted fitting for the pressure line. After I had changed lids and given the tank a “flow” test by blowing through the fuel line, my engine problem was solved.

The only thing that kept me from greatness at this point was six months' worth of rust build-up (while I was away from the track). I managed to qualify third and finish third in the A-main. A problem with the antenna tube's breaking right where it exits the body led to the bare antenna's wrapping itself around the rear axle. Even though I was sidelined for a lap, I still managed a podium finish. I feel I certainly had the best package on the track, only I lacked the skills to exploit it.

The new MBX-4RR is a cut above the previous model. Quite a few design changes have improved its racetrack manners and make it easier than ever before to click off the fast lap times.

• **Acceleration.** Getting power to the ground is marginally improved compared with the already nimble MBX. Positioning the rear diff 6mm farther back seems to have improved weight transfer slightly and gets the power to the ground more quickly. The new, 14-tooth clutch bell takes away just a touch of the bottom-end punch, but there's plenty of that with the NovaRossi BX21/SBK. When running on relatively high-bite tracks, forward bite can be improved with slightly heavier fluid in the center diff, but the stock setup seems to offer a good balance for average conditions.

• **Cornering.** This is where the RR really shines; 1/8 4WD buggies are notorious for poor steering, but the RR is the most responsive I've ever seen. Adding a rear anti-roll bar brings the rear end around



Above: the RR's six-gear differential is the same as the one in the original MBX, with the exception of the new molded housings that are lighter and supposedly more leak-proof than the previous aluminum housings.

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TRACK TEST Mugen MBX-4RR

quicker than before, and a slight reduction in wheelbase over that of the original MBX with the optional long chassis further adds to its responsiveness. I installed both of the caster shims to the rear of the front upper arms; that provides more steering than most drivers will ever want. Regardless of your preferences, the key is that you'll never mutter, "C'mon, ... turn, turn!!" Even more impressive is that for even more steering, the anti-roll bars can be removed.

The stock setup favors flat to marginally bumpy conditions with medium traction—a very good, neutral starting point. For bumpier tracks, go with lighter shock oil (25WT Trinity or Associated*, or Losi* 30WT) and lose one or both of the anti-roll bars. The standard Pro-Line 9011M2 tires offer excellent bite—enough to allow me to snip off the inner- and outermost row of pin spikes to reduce side bite.

• **Over the jumps.** The RR handles big bumps as well as any world-class buggy. The extra rear-suspension travel and the innate ability of nitro buggies in general to execute midair corrections combine to make the RR an excellent flier. The extra suspension travel also helps smooth out the landings.

FINAL ANALYSIS

The new RR is an excellent package for those who are interested in a competition 1/8 buggy. It doesn't have the depth of features found on its chief competitor—the MP-6 International—but what it lacks (a full set of universal-joint drive shafts, quadruple disc brakes and hard-anodized chassis plate), it makes up for with what I call meat-and-potatoes features. It comes with sealed bearings, pivot-ball front suspension and most of the other equipment you'll need to complete construction. A huge bonus is that the RR kit also includes shock oil, three bottles of diff fluid, a combination wrench for all the fasteners (including the wheel nuts), fuel tubing, an exhaust coupler and even fuel-tubing clips.

The MBX-4RR represents the best all-around package in 1/8 off-road racing. The MP-6 and its predecessors are multiple world and national champions with the polish and prowess of a finely tuned Porsche. I see the MBX-4RR, however, as more Viper-esque: lacking heritage and refinement, but well-featured, incredibly nimble and available for a comparatively reasonable price—certainly the best bang for the buck in the field.

*Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

**TRACK
TEST**

1/10-SCALE NITRO

HPI Nitro MT

It isn't an electric RS4 MT conversion.
Heck, it isn't even an RS4. by Peter Vieira



"What's next?" It's a question the gang at HPI* must be constantly asking themselves, since they seem to keep coming up with category-defining vehicles that are anything but the same-old, same-old. The Super F1, Nitro RS4, RS4 Rally and RS4 MT all broke new ground and either reinvigorated existing RC genres or invented new ones. The latest machine to spring from HPI's collective imagination is the Nitro MT—the company's first nitro-powered off-road vehicle. With its truck body shell in place, the Nitro MT appears similar to the RS4 MT, but there's all-new shaft-drive hardware underneath. That's why the Nitro MT isn't labeled part of the RS4 family. It's a machine all its own; is it one you should own?



DATA CENTER

VEHICLE TYPE 1/10-scale, nitro-powered, 4WD stadium truck

BEST BUYER Off-road RC enthusiast of any skill level. If you like the MT, get one.

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Good

Parts fit/finish Very good

Durability Satisfactory

Overall performance Very good

SPECIFICATIONS

SCALE 1/10

LIST PRICE \$499

STREET PRICE \$299

DIMENSIONS

Wheelbase 11.8 in. (300mm)

Width (F/R) 12.2/12.6 in.
(310/320mm)

WEIGHT

Total, as tested (1,956g)

CHASSIS

Type Double-deck plate

Material 2mm aluminum
lower/plastic upper deck

DRIVE TRAIN

Type Shaft

Primary 12T clutch bell/
52T spur gear

Transmission reduction 2.92:1

Drive shafts Dogbone

Differentials Bevel, 2-gear

Bearing type Rubber-sealed ball
bearings

SUSPENSION

Type Lower A-arm w/fixed camber
links

Damping Plastic-body oil-filled
shocks

WHEELS

Type One-piece mesh, chrome

TIRES

Type Pro-Line Dirt Hawg

ENGINE AND ACCESSORIES

Engine HPI Nitro Star 15FE pull-start

Carburetor Rotary

Pipe HPI, molded plastic

Manifold Cast alloy, bolt-on

ELECTRONICS (not included)

Transmitter Futaba Magnum
Junior FM

Receiver Futaba F113

Steering servo FMA Direct S3501

Throttle servo Futaba S3003

Receiver pack 5-cell Ni-Cd

LIKES

- Genuine Pro-Line rubber.
- Completely equipped with sealed bearings.
- Swing-out radio tray and easy-to-access engine make the MT easy to operate and maintain.

DISLIKES

- Steering linkages are not adjustable.
- Engine does not include a low-end needle or machined heat-sink head.
- Front suspension arms need to be tougher.



Since when does HPI have an $\frac{1}{8}$ -scale buggy? The metal ring gears should hold up well, and the all-new gearboxes appear well sealed; note the thin lip that fits into a recess in the front half of the gearbox. Sealed bearings are standard.



building & setup tips

If you're a longtime HPI builder expecting to see familiar parts and steps, you won't recognize many pieces when you crack open the parts bags. Still, the Nitro MT is built like other HPI machines (easily, as long as you follow the instructions). Just be sure to note any steps in the manual that are addressed by the addendum sheet (if the manual still uses one by the time you get your MT). My early production kit's manual wasn't completely up to spec, but the goofs were relatively minor and clearly corrected by the addendum sheet. These tips cover some items addressed by the additions to the manual as well as insights from my own building experience.

Step 1. Don't be stingy with the grease when lubing the pinion and ring gears. These parts take a beating, and they need lube to live. After each diff has been assembled, spin it and check the ring gear for any wobble; if it doesn't spin true, recheck the diff screws for tightness and snug down any fasteners you wimped on.

Steps 4 and 8. As the undisputed king of building kits backward, I invite you to triple-check your work before you bolt up the suspension-arm/arm-mount assemblies. It's easy to mount the arms incorrectly; they look symmetrical, but they are not. Watch it.

Step 6. Go ahead and replace the plastic bellcrank bushings with bearings. (You know you want to.)

Step 12. I prefer to leave dogbones dry to keep dirt at bay, but I lubed the drive pins on the MT's bones as the manual suggests. I didn't use the kit grease, however; I reached for black Associated* grease meant for such high-load applications.

Steps 14 and 19. You saw this one coming. These steps involve threading setscrews into metal outriggers and installing the engine, so remember to (all together now) ... apply thread-locking compound (Loctite to you and me) to all the screws highlighted in these steps.

YOU'LL NEED ■ Polycarbonate-compatible paint ■ CA glue ■ Fuel ■ Glow starter ■ 2-channel radio set ■ Steering and throttle servos ■ Receiver pack ■ Thread-locking compound

FACTORY OPTIONS ■ Nitro Star 15SS engine—part no. 1600 ■ Nitro Star Pro 12R pull-start engine—908 ■ Heat-sink head for Nitro Star 15—1703 ■ Yellow springs (soft, F/R)—6784; 6794 ■ Blue springs (firm, F/R)—6788; 6798 ■ Universal center dogbones (F/R)—72082/72083 ■ Purple titanium turnbuckle set—72094 ■ Graphite upper deck—73017 ■ Carbon graphite suspension arms (2 pairs)—A466 ■ Universal dogbones (F/R)—A518/A519 ■ Aluminum-body super shocks (F/R)—A723/A725 ■ Fiber disc brake—A844 ■ 2-speed transmission—A912 ■ Other optional parts are available (too numerous to list)

KIT FEATURES

• **Chassis.** The Nitro MT's foundation is sheet of purple-anodized 2mm aluminum. All the screw holes in the underside are countersunk, with the notable exception of the engine-mounting screws. The chassis' sides are folded up slightly to increase its rigidity, while the MT's molded upper deck and detachable radio tray contribute additional strength. The swing-out tray is a nice feature; the receiver, both servos and the receiver pack can be easily removed together simply by releasing the two body clips. That might sound like a recipe for a flimsy radio tray, but the setup is surprisingly solid once buttoned down, and the benefits of easy cleaning and dramatically improved drive-train access are apparent after just one dirty, dusty run.

• **Suspension and steering.** Here we find the only meaningful technical similarities between the Nitro MT and its electric forebear, the RS4 MT. Both trucks use the same lower suspension arms, steering knuckles and hub carriers, which are sprung by plastic-body shocks. The new bulkheads that position the arms on the chassis are designed to interface with the Nitro-MT's all new diffs. The Nitro MT's plastic shock towers appear similar to the electric MT's but are noticeably beefier. Plastic camber links pop onto steel ball studs to complete the suspension, which allows no adjustments beyond changes to shock position (three lower mounting options front and rear; two upper mounting options in the rear only) and spring preload (via snap-on preload clips). Damping may also be adjusted, but you'll need to add your own shock oil; the kit doesn't include piston options but does include a bottle of 30WT silicone.

Dual bellcranks take care of the steering and use a molded drag link for hassle-free assembly. Neither bellcrank incorporates a servo-saver; instead, the servo horn incorporates a plastic spring to do any "saving" that might be required. Molded links join the bellcranks to the steering knuckles, so toe-in adjustments aren't an option.

• **Drive train.** HPI departed from the successful belt-drive formula of the RS4 line and went with a full shaft-drive system for the Nitro MT. The stars of the show are the differentials. The bevel-gear internals are familiar, but the cast pinion and ring gears are new pieces that show HPI is serious about durability. The front and rear diffs are identical, as are the plastic housings each resides in. Sealed ball bearings equip all the drive train's rotating parts, and dogbone axles link the diffs to the wheels. Larger steel dogbones join the front and rear diffs to what looks like a center diff but is actually a fixed



There's room for a 2-speed (and HPI offers one), or maybe a center differential; the drive-train parts are ready to accept another disc-brake system if HPI adds a third diff. For now, one disc does all the stopping. It's plastic, but as you can see, it's thick.



It takes all of 5 seconds to remove the radio gear, and there's plenty of room to clean the chassis and engine once the radio tray is removed.

spur gear. This setup delivers full-time 4WD. The plastic gear spins in a plastic bulkhead that is capped to keep debris out of the clutch bell/spur gear mesh, and the cap incorporates a single disc brake. Interestingly, there is plenty of room for a center differential, and the cap has provisions for another brake (as a center diff would require). Although HPI does not offer a center diff, I imagine it soon will.

• **Engine and accessories.** The Nitro MT is relatively large, and its 4WD system puts a premium on power. HPI thankfully includes a .15 engine to supply the necessary squirt—a pull-start Nitro Star FE with a single-needle rotary carburetor. The piston and sleeve feature ABN construction (aluminum piston, nickel-plated brass sleeve)—not as nice as a chrome sleeve but certainly acceptable. A flywheel, clutch nut and clutch shoes

are factory-installed, leaving the builder to simply slide on the clutch bell. Sadly, the engine does not include a machined heat-sink head and relies instead on an old-school cast job. The Nitro Star's exhaust parts are more appealing; a cast, finned manifold feeds fumes to a plastic tuned pipe.

The engine is fed by a primer-equipped 75cc fuel tank—the type of unit shared with the Nitro RS4 series.

• **Body, wheels, and tires.** HPI's new chrome mesh wheels are included along with Pro-Line Dirt Hawg multipurpose tires. The Nitro MT's body is not a replica of any real machine, but it draws its styling cues from the most popular full-scale rigs. A com-

Futaba Magnum Junior FM

This Futaba® transmitter/receiver combo is tough to beat for low-budget performance, and it's a particularly good match for a nitro vehicle, thanks to its reliable FM operation. The throttle endpoints are adjustable (essential in a gas car), and the case feels as nice as the 3PD's and 3PJ's.

Futaba S3003 and FMA Direct S3501 coreless steering servos

A standard servo is more than adequate for throttling the Nitro Star engine and activating the single disc brake, and it will pass as a steering servo, but the Nitro MT requires more torque to steer effectively—especially when those Pro-Line Dirt Hawg tires dig in. I installed a much more powerful FMA Direct S3501 digital servo to keep the tires pointed where I want them, no matter how hard I drive. This servo has claimed output of 100 oz.-in. torque with a 0.10-second transit time—more than enough to steer the Nitro MT.

Byron Race 1500 fuel

This is Byron's® "sport drivers' fuel." According to the company website, the fuel provides 18 percent oil (the percentage specified by some manufacturers for warranty purposes), with an 80:20 synthetic/castor ratio. Sounds good to me! I had no overheating troubles with the Nitro MT, and it ran reliably all day. That speaks to the quality of the engine and the fuel.



Dynamite Ni-Cd receiver pack

Most hobbyists will probably outfit the MT with 4 alkaline cells to power the radio gear, but I opted for a Dynamite® 5-cell Ni-Cd pack. The extra cell allows the pack to match the voltage of the dry cells, with the wallet-sparing benefit of rechargeability.

TRACKTEST HPI Nitro MT

prehensive decal sheet is included, so it's easy to match the box art with a two-color paint job (although Kevin Hetmanski went for his own look with my test truck; thanks for the killer paint, Kev). The glow plug, fuel tank and pull-starter are easily accessed with the body in place.

PERFORMANCE

Without a doubt, the MT's Nitro Star .15 engine is the easiest to start and most reliable I've run. It didn't just start on the first pull; it seemed to start on the first pop: as soon as the piston made a pass through the cylinder, the engine was burbling along and idling smoothly. I let the engine idle as the truck sat on a block, but after about half a tank, I was too eager to see the MT run to leave it propped up spinning its wheels. I gingerly drove it around the *Radio Control Car Action* office parking lot until the engine's exhaust tone began to clear, then I leaned the mixture a click at a time as performance improved. After a few more tankfuls of fuel, the Nitro Star began to stretch its legs.

If it's speed you're looking for, the Nitro MT won't disappoint you—it's fast. If anything, it's too fast for the capabilities of the chassis (not that I'm complaining!). If you carve switchback turns too hard at speed, you can traction-roll the truck, and if you run in rough-woods-type terrain and open up the throttle, the MT is likely to bounce out of control before the engine tops out. Keep the speeds just a click on the sane side, and the Nitro MT can cope with just about anything. It's as wide as any off-road racetruck, and there's plenty of suspension travel to keep it stable.

You can easily overpower the Dirt Hawg tires in loose dirt, but

they grip well on pavement with just the right amount of looseness to satisfy sideways drift through turns. At speed, the Nitro MT understeers mildly and is easy to drive. Jumping is no problem; just roll on the power and stay on the gas for a flat landing, or let off to drop the nose to soak up some backside on roller jumps. All in all, the Nitro MT is a forgiving, fun-to-drive machine.

On the minus side, I did find the front arms very unforgiving of hack driving. While the rest of the MT is quite durable, the front arms are a weak link. I broke the right front arm at the inboard hinge pin on two occasions: once when I caught a board, and again when I cartwheeled the truck off a jump. I can't say another truck wouldn't have broken, but in my experience, other trucks seemed to fare better in similar situations. If you need to snake the MT through tight spaces, do yourself and the truck a favor: take it slowly. If you hit something, you'll be more likely to keep running with both front arms intact.

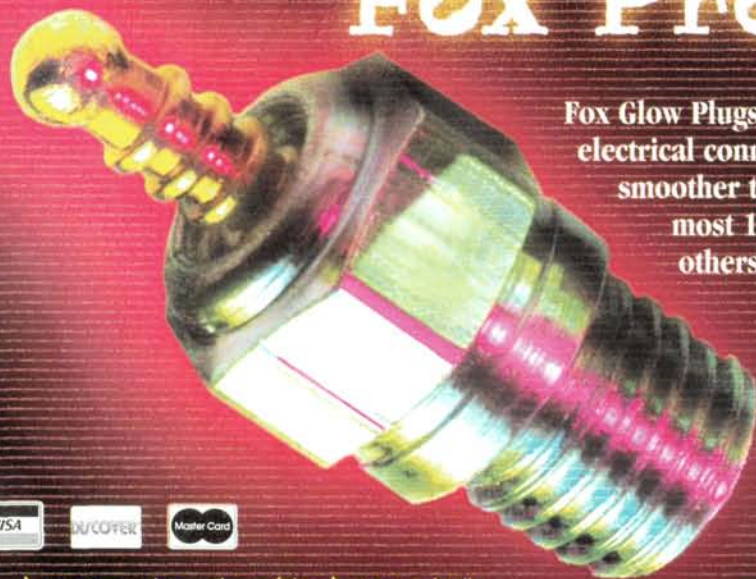
THE VERDICT

I like the Nitro MT a lot! If you want to get into nitro-powered off-road RC but hate to give up the convenience of electrics, the Nitro MT is a great place to get started in gas. It's fast, reliable and forgiving of beginner tuning mistakes (but when you get it dialed in—and it's easy to do—it really honks). The chassis is a lot of fun on- and off-road, and as long as you're careful not to snag the front arms at speed, it's very durable. It's also very "hop-up-able," which could be taken as a hint that Project Nitro MT is already under way!

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■*

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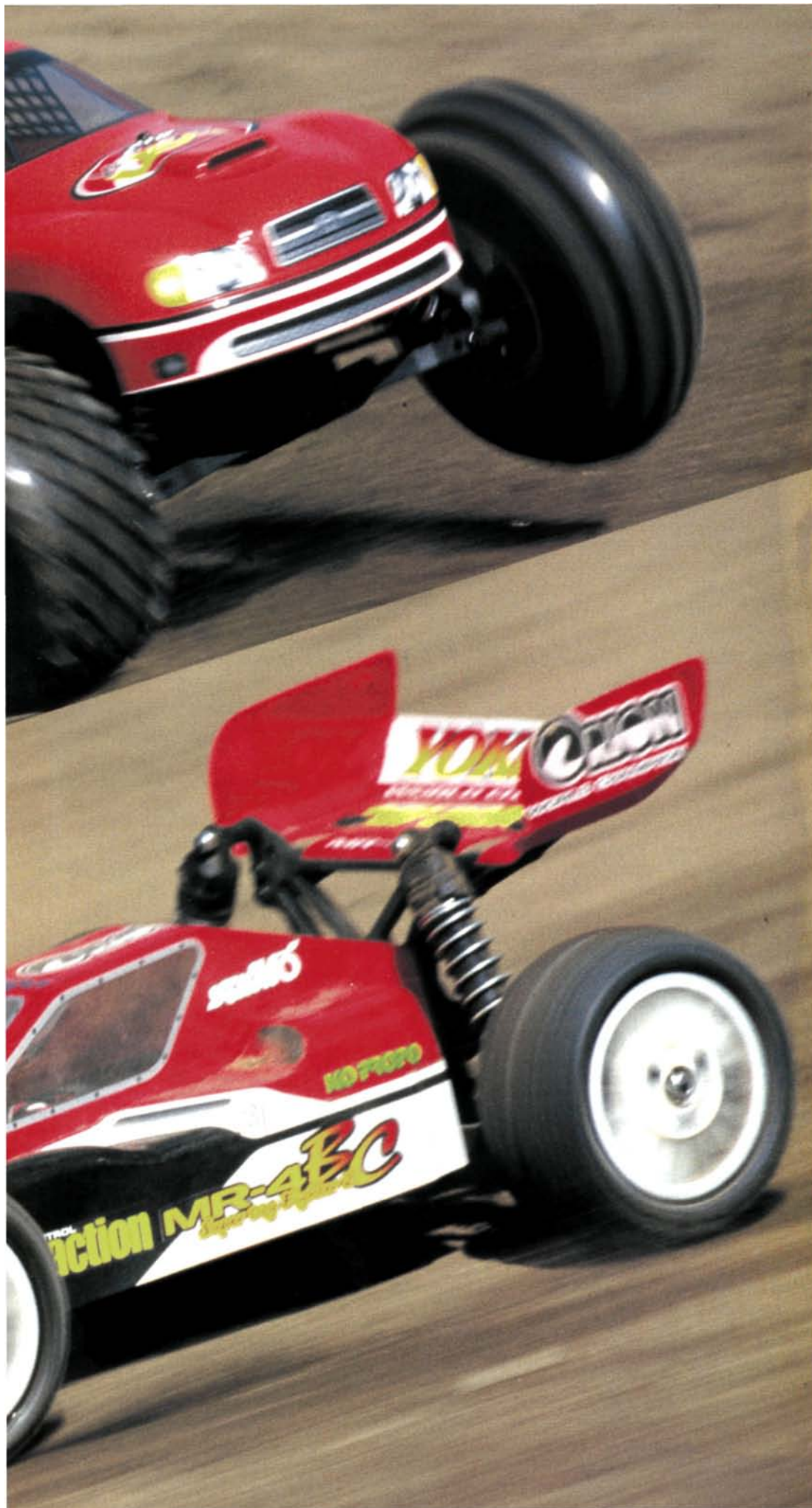
Yokomo MR-4 BC and MR-4 MT

The Super Dogfighter 2 and a super play truck, too

by Peter Vieira

Yokomo[®] has built a reputation on its racing successes and remains popular among the competition cognoscenti but until recently was perceived as being too exclusive for everyday hobbyists. The MR-4 touring and rally cars changed all that and brought Yokomo quality and performance to a new pool of eager customers (the establishment of Yokomo USA, which made it much easier to get kits, helped, too). However, the off-road set was still left out of the equation, as the exotic MX-4 buggy was still Yokomo's only pure dirt machine. That situation has been remedied by the release of not one, but two new off-road Yokes built on the MR-4 platform: the MR-4 BC Super Dogfighter 2—the latest 4WD buggy to wear the storied Dogfighter badge and the MR-4 MT—a truck version of the same machine. Designed for performance, but equipped to be affordable, these latest Yokomo releases have an interesting mix of features. Let's see how they go.





DATA CENTER

VEHICLE TYPE 1/10-scale, 4WD, off-road truck (MT) and buggy (BC)

BEST BUYER Enthusiasts who don't mind paying a little extra for a high-quality kit that's also "something different."

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Good

Parts fit/finish Very good

Durability Very good

Overall performance Very good

SPECIFICATIONS

SCALE 1/10

LIST PRICE \$280 (MR4-BC)/

\$295 (MR4-MT)

STREET PRICE \$160/\$170

DIMENSIONS

Wheelbase 10.23 in. (260mm)

Width F/R 9.7/9.8 in. (BC),

11.6/11.5 in. (MT); (247/248mm; 295/292mm)

WEIGHT

Total, as tested (BC/MT)

56 oz. (1,588g) 61 oz. (1,730g)

CHASSIS

Type Molded semi-tub

Material Fiber-reinforced plastic

DRIVE TRAIN

Type Dual-belt

Primary Pinion/spur gear

Transmission reduction 2.2:1

Drive shafts (F/R) Universals/dogbones

Differentials Ball

Slipper clutch None

Bearing type Oilite bushings

SUSPENSION

Type Lower A-arm w/turnbuckle upper link

Damping Oil-filled, coil-over shocks

WHEELS

Type One-piece plastic 2.2 in. (BC), 2.3 in. (MT)

TIRES

Type Yokomo mini-pin (BC), Pro-Line Dirt Hawg (MT)

ELECTRONICS (not included)

Transmitter KO Propo EX-I Mars

Receiver Novak Double XL

Steering servo Airtronics 94157 (BC), 92104 (MT)

ESC Novak Dually (BC), Reactor (MT)

Motor Team Orion Orbital 2

LIKES

- Well-made parts have a high-quality feel and fit precisely.
- Large, stick-on graphics make it easy to achieve a good-looking paint job.
- Turnbuckles and universal drive shafts are stock equipment.

DISLIKES

- Bearings are not included.
- No slipper clutch.
- Does not accept standard spur gears without optional adapter.

TRACK TEST Yokomo MR-4 BC and MR-4 MT



building & setup tips

The BC and MT are both easy to build; if you give the instructions a read-through and highlight the "Please note before assembling" messages and the wacky caution guy, you'll have no problems. I'll shed some extra light on the less smooth spots.

BUILDING

Chassis prep. The manual indicates you may have to remove some material from a pair of screw bosses where illustrated. Trust me, you *will* have to do this, or the suspension arms will not fit. Use an X-Acto knife to shave the plastic, then trial-fit the suspension arms to the chassis with the bulkheads in place; repeat until they fit.

Ball-diff assembly. One of the front diff's plastic outdrives has a molded recess meant to hold the diff nut. The fit is precise, and it's difficult to drop the nut into place without having it jam in sideways. You can easily install the nut if you pass a diff screw up through the outdrive, thread the nut onto it (just a turn or two), then pull the nut into place.

Motor-plate installation. Use Loctite* on the screws that are threaded into the aluminum motor plate. Don't forget the tensioner screw.

Servo-saver installation. Once again, the manual calls for some parts shaving. Trim the bellcranks where suggested to ensure a bind-free operation. Only a little material needs to be removed. While you're at this step, use Loctite when installing the bellcrank posts.

Shock assembly. Saturate the foam volume-compensation sleeves fully before you install them. I didn't find it necessary to fill the caps with fluid as suggested by the manual. Just fill the shocks, tap out the air bubbles, add fluid until it forms a dome over the threads, then install the cap and bleed the shocks as indicated.

SETUP

The included old-tech shock oil will work fine, but I swapped it for Team Losi Certified fluid. I used 30WT, the same weight as Yokomo supplies. How did I know the weight? Yokomo prints it on the bottle. Thanks; there's nothing worse than "mystery oil."

Although helpful, those true-to-scale diagrams that indicate how long to make the camber links never quite deliver perfect camber settings. I used an RPM* camber gauge to set both machines with 2 degrees of negative camber all around, and I eyeballed 1 degree of toe-in up front.



The steering bellcranks are held high on the chassis and pivot on metal bushings. The left bellcrank is equipped with a servo-saver. Note the shroud that allows the drag link to pass beneath the front belt without leaving it open to debris (once the bellcrank/belt cap is installed, that is).

YOU'LL NEED ■ Electronic speed control ■ Battery (stick- or side-by-side type) ■ Charger ■ Steering servo ■ CA glue ■ Polycarbonate-compatible paint ■ Transmitter and receiver

FACTORY OPTIONS ■ Rear universal drive shafts—part no. ZS-010RB ■ 10mm offset hubs—ZS-H100B. ■ Low-friction 44T rear belt—ZS-132S ■ Soft shock springs (F/R)—YS-2F-2, YS-2R-2 ■ Bearing set for MR-4 series (12 pieces)—ZS-033B ■ Partial list; other optional parts are available

KIT FEATURES

• **Chassis.** The BC/MT's injection-molded chassis are shared with the rest of Yokomo's MR-series cars. The plastic appears to have a fairly high fiber content, and the bulkheads that fit onto it virtually snap into place thanks to precise molding. The chassis feels sufficiently rigid all by itself, but combined with the girder-like "backbone" that runs down its centerline, it's a brick. That backbone also divides the chassis, making saddle packs an awkward proposition. The BC avoids saddle-pack hassles by having all 6 cells mounted on the right side of the chassis, leaving the electronics to the left side. Scallops molded into the battery tray allow side-by-side cells to be fitted without compromising stick-pack fit. A plastic strap secured by a single body clip holds either configuration in place.

• **Suspension and steering.** No tricks here; front and rear lower A-arms pivot on hinge pins, and steel turnbuckle camber links hold the hub carriers in position. In typical Yokomo fashion, the A-arms are thick, blocky pieces that appear ready to shrug off the worst hits. The front arms are capped for extra rigidity, and the front hub carriers have a pronounced "chin" that positions the outboard hinge pin close to the center of the rims' width. The hub carriers also feature a large bell-shaped cowl that



The chunky suspension arms, hub carriers and steering knuckles look tough, and the universal-joint front axles are well protected by the enclosed hub carrier. Yokomo's trademark 3-bolt hex hubs are found on both MR-4 off-landers.

increases the hubs' rigidity and protects the front universals from some of the dirt and debris churned up by the tires. The rear hub carriers are more conventional and, like the fronts, offer a single camber-link position. Three holes for the hinge pin permit the carriers to serve double duty on the MR-4 TC tourer. Likewise, the front hub carriers and steering knuckles are found on the road-going MR machine. Dual steering bellcranks with a built-on, adjustable servo-saver and turnbuckle links are also shared.

The suspension-arm mounts are molded into the front and rear bulkheads, leaving kick-up and rear anti-squat fixed at 15 and 3 degrees, respectively.

Plastic dampers are standard. The internals are very similar to Associated's latest VCS units: a plastic bobbin holds a foam sleeve that acts as a volume

compensator by absorbing the shock fluid that is displaced by the shock shaft as it enters the shock body. The bobbins and O-ring seals are loaded from the top of the shock and snapped into place, and the shocks are topped by a plastic cap after they've been filled. The shock caps' bleed holes make it easy to achieve very smooth action, and three piston options included with the kit adjust damping. Thick plastic shock towers anchor the suspension system and are molded with integral "wings" that are drilled for the camber links (five holes per side up front; a whopping eight out back).

• **Drive train.** Both machines have ball differentials with plastic outdrives up front and steel units in the rear. Two belts drive the car, but Yokomo cleverly avoids the pitfalls of a high-mounted layshaft by spinning both belts via a single, wide pulley bolted directly to the spur gear. The spur is nestled closely to the rear diff, and the assembly sits very low on the chassis. This leaves no room for the motor (not included) between the belts and chassis, so the motor is offset to the chassis' left side. This might lead to an unbalanced chassis in a saddle-pack car, but since all 6 cells are held on the right side of the chassis, everything balances out rather well. The motor is mounted on a cast-aluminum motor plate that is impressively reinforced and should aid motor cooling. A pair of bearings attached to the plate are used as a belt guide but have no tensioning effect.

The assembled drive train is well sealed against debris, thanks to the enclosed belt pathway molded into the chassis "backbone" and the plastic shroud that covers the pinion/spur-gear mesh.

• **Body, wheels and tires.** The MR-4 BC's body drew mixed reviews from our editors, but I like it; large flat areas recall the faceted look of the MX-4, but softer edges update the overall profile. Hot Laps TF-39 pin-spoke tires with soft foam inserts are fitted to Yokomo's trademark vaned rims that are mounted to the axles via huge, 3-bolt hex hubs. You can remove the wheels by removing the axle nut and leaving the hub in place on the rim, but then the axles' crosspins fall out.



This is about as tight as a belt drive train gets—the spur gear actually overlaps the diff's outdrive bearing! The gearbox, spur gear and differential are held as low on the chassis as possible.

Team Orion Orbital 2 Mach Mod motors

I installed a 10-triple in the BC and a 13-triple in the MT. Milder winds would have suited both MR-4s better, but who doesn't like speed? The machine-wound Team Orion⁺ Orbitals offer a great combination of power and economy. They're also super-easy to install, thanks to prewired bullet connectors (which I didn't use for this installation) and surface-mounted capacitors. The Orbital 2 motors are also offered in a "Pro BB" version with bearings instead of bushings.

Team Orion V-Max Plus 2000 matched pack and V-Max 2400 stick pack

Since I had race plans for the BC, I went with V-Max Plus 2000 cells—Orion's best Ni-Cds. The MT's more playful mission put a premium on convenience and run time, so I installed one of Orion's new V-Max 2400 sport packs and added Deans⁺ plugs for a zero-loss connection without hard-wiring hassles.

Novak Dually and Reactor ESCs

As you might have guessed, the BC got the Dually, which I set up with the modified profile (the Dually can also be set with a punchier stock-motor profile). For reversing fun, Novak's⁺ Reactor is tough to beat, and it proved a good match for the MT.

KO Mars transmitter and Novak Double XL receiver

I had room in the Mars' 10-model memory for both Yokes, so in they went. I used the factory KO receiver in the BC and installed a Novak Double XL receiver in the MT. With a 2-second crystal swap and a few key clicks, I can run both machines from Mars (so to speak).

Airtronics 94257, 94102 servos

The race-prepped BC got the high-torque (110 oz.-in.), high-speed (0.06 second) 94257 servo, while the MT was given Airtronics' 94102 standard servo. The he-man servo is overkill in an electric buggy, but I didn't have another servo that was off the active-duty list. Hey; better too much servo than too little. Speaking of too little, the 94102 servo held up just fine in the MT; when you aren't asking the servo to hold a tight line under heavy acceleration with a lot of bite, a standard servo is all you need.

The MT uses the same hub setup, but 2.3-inch truck rims are fitted (that's no typo; the rims are "Inch Ups" for trucks!). Pro-Line Dirt Hawg all-purpose tires are included and need no introduction. The MT's Toyota Tundra body is a nice caricature of the real deal, and like the buggy shell, it is well molded. Unlike the buggy body, the Tundra has no overspray film. Both bodies include well-stocked decal sheets with factory graphics for a good-looking finish on a single-color paint job.

PERFORMANCE

• **MR-4 MT.** I tested the MR-4 MT first, with a day of fun-running at Xtreme Radio Control's newly remodeled track. The truck was blisteringly fast with the Orion 12-double motor, but it was a handful to drive. Tall tires, soft suspension and ballistic speed made it nearly impossible to prevent the car from swapping ends when pitched through sweeping turns, but it was a blast to drag up and down the straightaway. The track layout didn't offer much in the way of big jumps, but a whole lot of dirt was conveniently piled next to Xtreme's tractor. After a few minutes of packing and shaping, I had a good-looking, Evel-Knievel jump that would launch the MT over the tractor (I hoped). I actually pulled it off on the first attempt, and, after bottoming out on the landing, the MT motored on happily. I made a few more passes at the tractor and occasionally smashed the MT into its side, but nothing broke. The only thing that dampened the fun was short run times; as I expected, the stock, 20-tooth pinion was too much gear for the MT's big tires, and I only managed about three minutes per pack (not including the time I spent waiting for the Novak Reactor ESC to come back online after it shut down because it overheated). I installed a 17-tooth pinion, and it extended my run time without a noticeable effect on top speed. The MT was still overgeared, however, and the Reactor's automatic safety shutdown mode was still activated at least once per run. Since I already had my smallest pinion in the truck (and a larger spur gear was not an option because the spur is a Yokomo-specific part), I postponed running the truck any more until I could install a milder motor.

I took the MT out for a spin a few days later at RC Madness, where I was racing the Super Dogfighter 2. This time, I installed a Trinity Chameleon 19-turn motor and kept the action on the pavement. The 19-turn motor seemed perfect for the MT; it was still very fast, and run times were very good. I got a solid six to eight minutes out of a 2000 pack. The MT is a lot of fun on flattop; the truck's short wheelbase makes it very nimble. Be careful, though; the MT's narrow track makes it want to roll over unless you ease off the throttle. If you don't mind risking the body work, you can roll the MT up onto two wheels, countersteer to maintain balance and see how far you can ride it out (my best was about 20 feet).

The Dirt Hawg tires grip well on pavement, but that grip can be tough on the tranny since it has no slipper clutch. I had no belt-skip problems when I launched the truck, but if you slam it from forward to reverse (or vice versa) without stopping completely, the front belt will skip with a painful-sounding "braaack." Believe me; you don't want to hear it.

• **MR-4 BC.** The BC saw its first real action at RC Madness when I entered it in 4WD mod class. Unfortunately, Madness was out of Yokomo buggy rims, so I was stuck with one set of tires for the day.

The BC's smaller tires make it easier to gear, but I did find that the

20-tooth pinion was more gear than I required for the Orion 10-double motor and available traction. I went down to an 18 and headed out for practice. The dirt was perfect; it was soft, moist, loamy and freshly groomed; traction was easy to find. The BC felt good right out of the box. It tracked beautifully down the long back straight, drifted predictably in the turns, cleared the doubles (when I hit 'em right) and just felt right. I was psyched for qualifying.

My day went downhill from there. By the time my race went off, the track was bone dry, and that thick soil had become slippery dust. The Hot Lap mini-pin tires weren't hooking up, and I couldn't get on the gas as quickly (or as hard) as I wanted. Then I clipped a pipe and broke the car. The left steering knuckle split, and the wheel rolled right off the car, dragging its drive axle behind it.

The MR-4 MT donated a steering knuckle to the buggy, and I went out again. A few laps later, I broke the car once more. Same pipe, slightly different result: I popped the left suspension arm. Another DNF, another trip to the pits, and the MT was soon missing a few more parts so the BC could make the third qualifier. I was very surprised at all the breakage; after beating on the MT and breaking nothing, I couldn't understand why the buggy was getting torn up.

In addition to suspension parts, I robbed the MT of its Chameleon motor, figuring that "slow is fast," and the car would be easier to drive if I didn't have to fight a 10-turn motor in slippery conditions. Everyone laughed when they saw the Chameleon peeking out from under the body (I think the next-mildest motor in the Main was a 13 double), but I didn't get left behind at the start tone. I didn't reel

anybody in, either, but I think everyone was surprised by how quick the car was. Unfortunately, the track was badly rutted from the first two rounds (which included 1/10 gas truck and 1/8 buggy heats), and the BC was bounced around like a Super Ball. I quickly fell off the pace as I played "which-way-will-it-bounce?" through every lap. I went to a lighter shock fluid in the rear shocks for the Main, hoping that this would allow the suspension to extend and compress more quickly, and therefore, stay better planted through the ruts. It helped, but the BC was still tough to keep pointed in the right direction (I don't think its short wheelbase helped much, either). For rough-track racing, it needs a new setup.

THE VERDICT

Yokomo's new MR-4 off-road vehicles are precision machines that are a pleasure to build and drive but a little pricey, given the level of their equipment; after all, these are bushing kits. But there's more to these kits than simple economics; there's just something a little cooler about a Yokomo, and if that's worth a few extra bucks to you, then go for it. The MR-4 MT is a fun little truck that likes to play in the dirt and in the street, and since it shares all its parts with the MR-4 BC, you could easily pick up a Super Dogfighter 2 body set, wheels and tires if you ever want to try racing. For fast, smooth tracks, the BC should require minimal dialing in. On the other hand, my experience shows that some heavy-duty wrenching is going to be needed to make this car ready for East-Coast-style action. As for durability, only time will tell; but given my good experience with the MT, I'm chalking up the BC's breakage woes to bad luck, and I'm keeping my fingers crossed. Look for an update on the MR-4 BC soon; I'm determined to make this car work as well as I know it can.

* Addresses are listed alphabetically in the "Featured Manufacturers" on page 216. ■



Here's the tractor jump. I landed this one, but piled the truck into the side of the Craftsman rig on later attempts. Nothing broke.

**TRACK
TEST**
1/10-SCALE ELECTRIC



Cross Fire Force CF-01

Will this innovative open-wheeler
rekindle the flames of F1?

by Greg Vogel

When Cross' debuted its new CF-01 Fire Force F1 car,

we were very eager to wring it out on the track to see whether it carries the Cross standard of quality and performance; after all, Cross's aftermarket hop-up parts are some of the best in the business, so a complete car kit from the company definitely merits attention. Anyone who's interested in trick RC stuff will want to take a look, but if you're already into F1 tech, this is a must-see car. With its full-size-car-inspired suspension and authentic-looking rubber tires, the Fire Force could even bring F1 back into parking-lot prominence. Let's see what the Fire Force has to offer.

DATA CENTER

VEHICLE TYPE 1/10 electric F1 car
BEST BUYER enthusiasts who are looking for an F1-style, tunable race-car to run in a parking lot or race on a track.

KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions good
Parts fit/finish very good
Durability very good
Overall performance very good

SPECIFICATIONS

SCALE 1/10
STREET PRICE \$229.99

DIMENSIONS
Wheelbase 10.25 in. (260.35mm)
Width 8 in. (203.2mm)

WEIGHT
Total, as tested 42.75 oz. (1,085.9g)

CHASSIS
Type Double-deck
Material (upper/lower) Plastic/fiberglass

DRIVE TRAIN
Type Direct-drive
Primary Pinion/spur gear
Drive axle Steel
Differential Ball
Bearing type Oilite bushings and ball bearings

SUSPENSION
Type Upper and lower A-arm
Damping Friction damper w/coil-over spring

WHEELS
Type BBS-style

TIRES
Type Sticky rubber slicks with foam inserts

ELECTRONICS (NOT INCLUDED)
Transmitter Hitec Lynx 3D
Steering servo Hitec HS 235 AG
ESC Keyence A-01
Motor Trinity P2K

LIKES

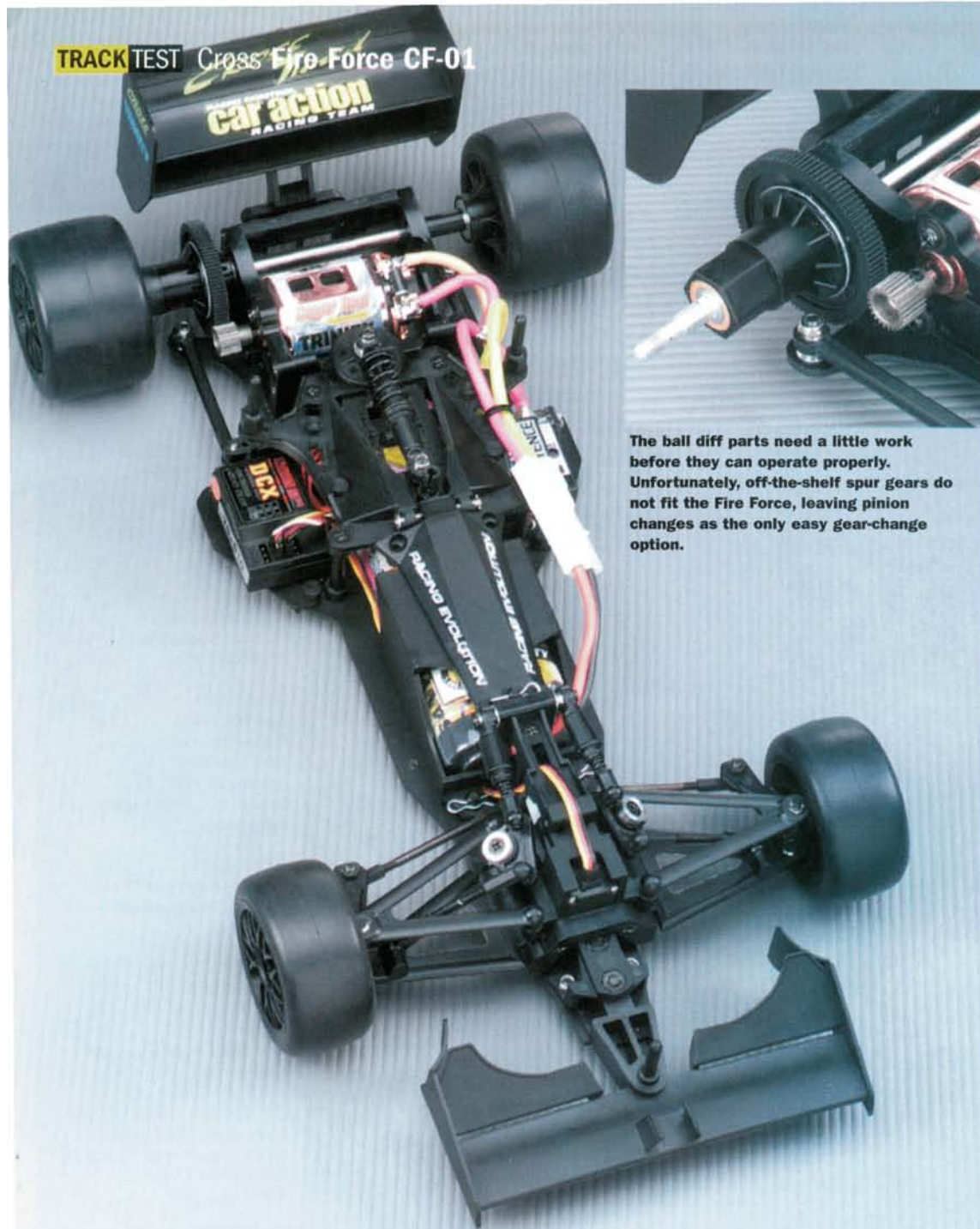
- Two battery-mounting options.
- Tunable suspension.
- Consistent handling.
- High-grip race tires included.

DISLIKES

- Bushings supplied for the front wheels and diff.
- Plastic motor plate.
- Body not included.



TRACK TEST Cross Fire Force CF-01



The ball diff parts need a little work before they can operate properly. Unfortunately, off-the-shelf spur gears do not fit the Fire Force, leaving pinion changes as the only easy gear-change option.

building & setup tips

Although the Cross F1 is more complex than other F1 kits, it's still fairly simple to build. The following tips correspond to steps in the manual.

■ **Step 1.** The kit calls for rubber cement to glue in the sponge tire inserts; instead, use Trinity* Bomb Glue. It's much stronger yet is still flexible enough not to create hard spots in the inserts.

■ **Step 2.** To get rid of its sharp edges, lightly sand the edges of the fiberglass lower pod plate.

■ **Step 6.** Note that the trailing link on the motor side should not be completely tightened; it will have to be removed later to install the spur gear.

■ **Step 10.** Before the servo is mounted, the ears must be removed—just the ones on the opposite side of the servo output shaft.

■ **Step 15.** If you plan to mount the battery in the inline position, skip to step 21 and follow the battery-holder installation instructions from there.

SETUP

Battery position is one of the most effective tuning adjustments you can make, and it's one of the simplest. Placing the pack across the chassis works well in high-speed and low-grip applications. On more technical tracks that have good bite, try placing the pack inline.

YOU'LL NEED ■ 2-channel radio system with receiver and one miniservo ■ ESC ■ Motor ■ 6-cell battery ■ Battery charger ■ Body ■ Polycarbonate-compatible paint ■ CA glue for tires ■ Rubber cement for tire inserts

FACTORY OPTIONS ■ Carbon chassis (main/rear)—part no. CFP-1/CFP-2 ■ Spring set (F/R)—CFP-6F/CFP-6R ■ Bearing set—CFP-15 ■ Aluminum post set—CFP-32 ■ Aluminum motor-mount set—CFP-120



Left: It has a few more moving parts than the usual sprung king-pin setup, but the Fire Force's front suspension is not complex. The large bellcrank pivot helps minimize slop. The front and rear "shocks" are merely sprung, lubricated shafts that offer no real damping. A sliding friction damper (right) helps slow the rear pod's roll action.



KIT FEATURES

• **Chassis.** Cross's platform for the Fire Force follows traditional F1 design. It has a main chassis plate with a floating rear pod and a multiple-piece, composite upper deck. The main chassis is cut from black fiberglass and is countersunk to prevent screw heads from dragging on the ground. The lower rear pod plate is also cut from fiberglass and features a wing on either side to attach trailing links from the pod to a bulkhead on the main chassis.

The molded upper deck serves as chassis stiffener, suspension mount and battery retainer. The battery can be held across the chassis, like current F1 kits from Tamiya and Kyosho's old F1 design, but unlike those, the Cross car's battery can also be mounted along the chassis centerline. Battery position has a dramatic effect on handling (for details, see "Building and Setup Tips"), so racers are sure to appreciate this important feature.

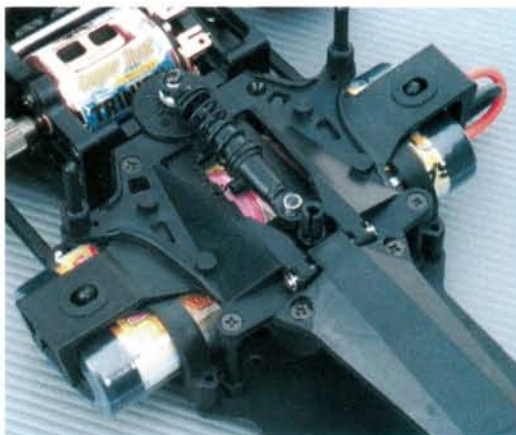
• **Suspension and steering.** The front suspension is built around the steering servo, which is taped and clamped into a bulkhead-like housing. As with most F1 cars, the Fire Force calls for removal of the servo's lower mounting ears. The lower suspension arms are unique; they are constructed in an unusual way. Each arm has a fiberglass plate "skeleton" that the plastic arm is molded around. The completed parts have a sculpted look and are very rigid—much more so than all-plastic arms. Pins hold the arms in the arm mounts. The rear of the mount contains setscrew downstops, while the front retainer houses small brackets to set the suspension with either 1 or 2.5 degrees of kick-up. Molded upper arms are retained by ball studs and pinch the steering knuckles against the lower arms.

To suspend the arms, a bellcrank-style inboard shock system is used. A linkage attached to the lower arm actuates the bellcrank and, in turn, the damper. These are nothing more than lubricated plastic shafts with preload springs, housed in a plastic "shock."

The rear suspension is similar to that of the now-defunct HPI Super F1 and features a rear pod that houses the motor and axle. The pod is articulated by means of a single pivot ball in the lower pod plate and a pair of trailing arms. A larger version of the friction dampers used for the front suspension handles front-to-back pod movement, while lateral damping is handled by a greased puck that slides on the upper deck and pivots in conjunction with the rear pod. Since the Fire Force has no T-bar, another means of centering the rear pod had to be developed. A pair of spring-loaded, fiberglass "jaws" holds the pod centered on the chassis. As the pod twists, it pushes on one of the jaws, which re-centers the pod when turning forces subside. The tension of the jaws can be adjusted by moving the spring that is installed between them to mounting holes closer to or farther from the jaws' pivot. To set tweak, a cam is attached to the pod between the jaws. By rotating the cam, the pod's "at rest" position can be precisely centered.



The Fire Force can hold a stick pack along the chassis' centerline (above) with the radio gear on the side "wings," or across the chassis width with the radio gear under the top deck (below).



• **Drive train.** A direct-drive, ball-differential system like that of a pan car is used to put the power down. The system's steel axle is supported by ball bearings in adjustable axle mounts. Several mounts are provided to adjust rear ride height. The diff rings are hexed to key into the support hubs so they don't spin under acceleration. A 98-tooth, "metric-64" pitch spur is supplied and houses six differential balls. The spur and wheel hubs are supported by bronze bushings.

• **Wheels and tires.** Cool, black mesh, BBS-style rims are bolted to the car's four corners. Very sticky, soft tires are provided to lay down the traction, and foam inserts keep the tire from collapsing.

• **Other stuff.** A rear wing and front spoiler are supplied to build the car as an F1 racer; these parts are flexible, and they should not break in a crash. A front bumper and body-mount extensions are also included, in case you want to put a GT-style body on the car.

Electronic mounting plates are also supplied for the optional vertical battery-mounting position. If you choose this position, there isn't any room left on the chassis for electronics; they must be relocated to the outside of the rear chassis.

Hitec Lynx 3D

This is one of the least expensive FM computerized radio systems on the market today, but Hitec* has packed it with race features that will help get your car dialed in. The system features 10-model memory, endpoint adjustment, dual rate, exponential and more. The radio also comes with a Ni-Cd battery pack and charger.

Hitec DCX receiver

This dual-conversion receiver is very reliable, and with its dual filters, interference shouldn't be a problem. The DCX is included with the Lynx 3D and is also available separately for use with other radio systems such as Futaba and Airtronics.

Hitec HS-235 AG

The AG (aluminum-gear) servo is new from Hitec and is much the same as the MG (metal-gear) unit, except it's lighter. The miniservo fits snugly in the front case of the Cross car and should do the job of turning the wheels with no problem, as it sports a claimed transit time of 0.09 second and 43 ounces of torque.

Keyence A-01 ESC

So small! The A-01 features push-button setup and even squeezes a current limiter into its tiny (1x1-inch) case. In most applications, the A-01 doesn't require a heat sink, but Keyence* provides one in case you feel it's necessary.

Trinity 2400mAh battery pack

If you want power and run time, one of these packs will give you what you need. I chose a stick pack because it allows me to use both of the car's available battery positions.

Trinity P2K motor

For stock power, you can't go wrong with a P2K. Even if you don't plan to race, the P2K is a good choice, since you can rebuild it as often as you need to, and that will stretch your motor dollar. And since it is a stock motor, you'll be able to stretch your run times. For the lightweight Cross F1, stock power is all you need.

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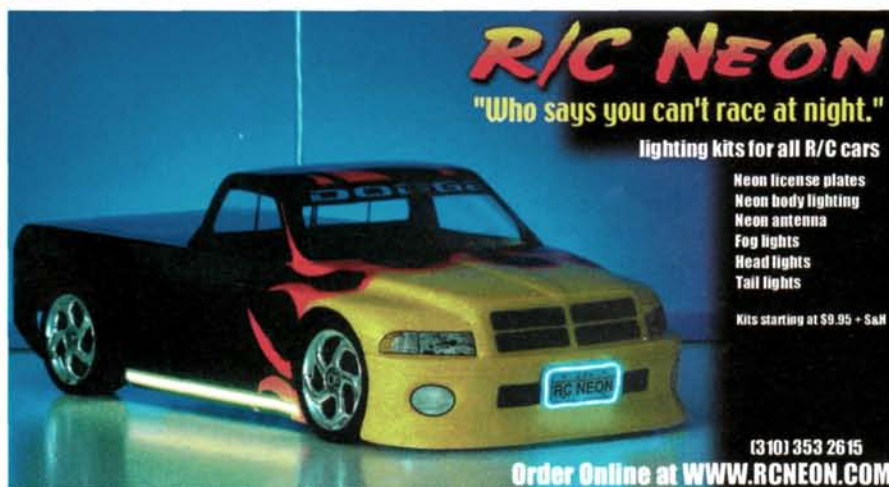
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TRACK TEST Cross Fire Force

PERFORMANCE

F1 cars in general handle a lot like pan cars, and the Fire Force is no exception. It is incredibly fast and tends to have an on-power push. Even though the Fire Force is a competition-level car, I first tested it as a car enthusiast who would be running it in an ordinary parking lot. The car was all over the place. It spun out as if it was tweaked and had a horrible on- and off-power push. I placed it on a Hudy setup board and found that the car was tweaked. I set up the car as the manual suggested, but some of the adjustments were, apparently, slightly off. I reset the droop, suspension tie-rod length and front damper length. I also discovered a problem with the diff during building. It wouldn't tighten or diff properly when spun. To solve the problem, I had to install two 8x10x.02mm washers between the axle hex and the diff washer hub. I also switched the battery position from vertical back to horizontal because there is too much chassis flex when the battery is mounted vertically. Back in the lot, there was a noticeable difference. The car handled much better and no longer spun out with the slightest throttle input. Make certain to double-check any adjustments before you drive the car. If it isn't tweaked properly, it won't drive properly.

To test it under real race conditions, I brought the Fire Force to RC Madness in Enfield, CT. The asphalt is new and clean, and the layout was perfect for really wringing out the car. The car took off quickly and drove straight, which meant there was no problem with diff-ring slippage. It also handled much better on the prepared surface. The kit tires hooked up to the rubber that was already laid in the groove. However, the car still exhibited an on-power push as well as an off-power push entering the corner. To correct the push, I stabbed the brakes slightly before entering the corners. Exiting the turns was not a problem; the car settled, gripped and was ready for the next set of road conditions in its path.

THE VERDICT

The Fire Force is straight up "badass." No doubt, it's a rocket with a direct-drive system, but the car has the advanced suspension geometry to lay down the power while giving you full control. I would like to see the class return to the glory days of the early parking-lot scene, when open-wheelers ruled and touring cars were an upstart class. The sight of a fleet of open-wheeled F1 cars tearing up a roadcourse is very exciting, and the Fire Force would most assuredly be at the front of the pack.

*Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

Take a moment to feel the power. Along with the other readers of *Radio Control Car Action*, you are a force to be reckoned with. You see, you are the RC car hobby. Your opinions mean everything to the many manufacturers

of RC cars and equipment; if you think you're interested in the results of this little awards ceremony, you should see the way the manufacturers tear into this issue! Everyone wants to be your Number 1. Who came out on top? Did your picks pull through? The votes are in!

RADIO CONTROL car action READERS' CHOICE AWARDS 2000

BUGGY



Team Losi Triple-X

It's a major upset!

Associated has owned the buggy category since the first "Readers' Choice Awards" back in '96, but Team Losi came on strong with a decisive win for 2000. The Triple-X was an instant hit; from the moment it arrived, its many innovative features have had local racers and top drivers alike experiencing Triple-Xtacy.

- 2 Associated RC10B3**
- 3 Thunder Tiger EB-4**

Associated RC10T3

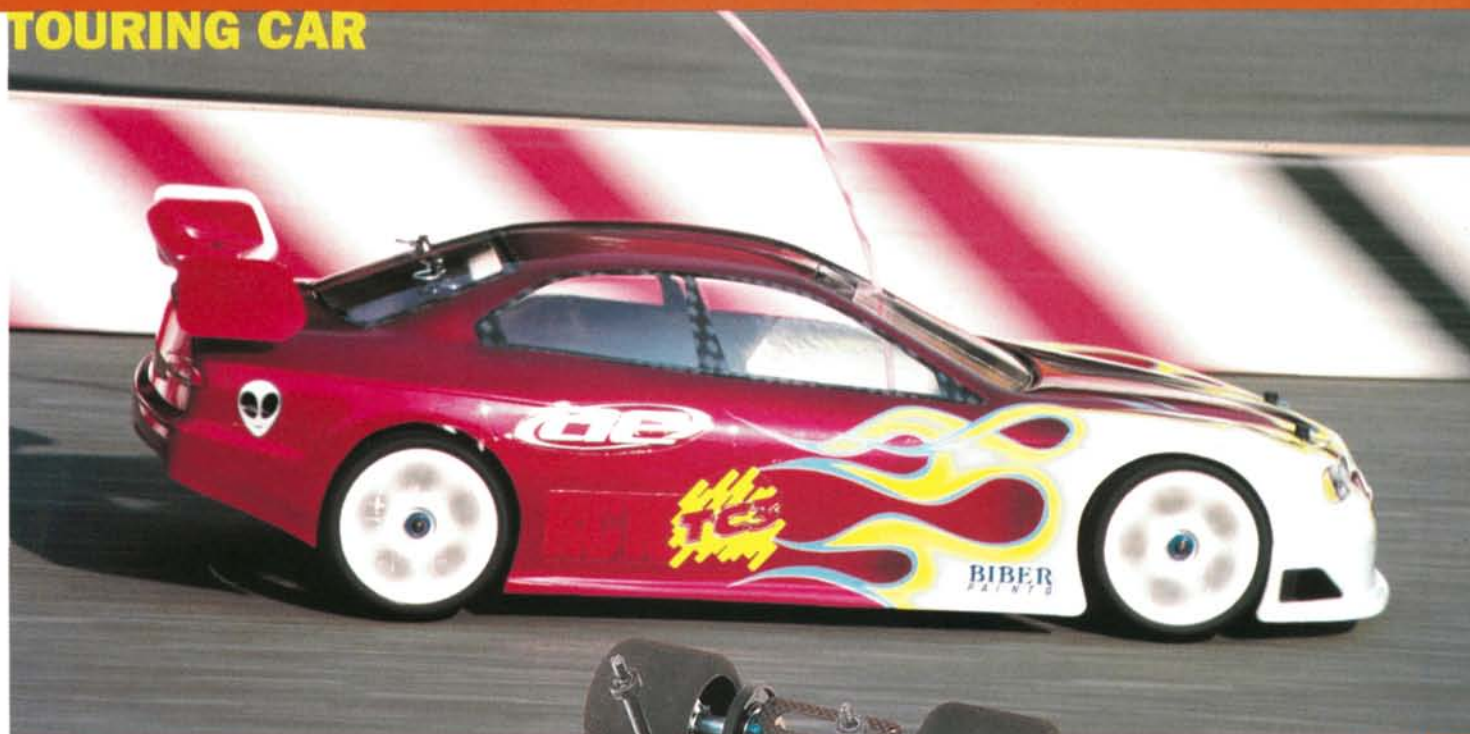
For the fourth year running, Team Associated's top electric truck is your favorite flatbed. Second place went to the A-team as well, making it clear that when it comes to trucks, *Radio Control Car Action* readers like to be associated with Associated.

- 2 Associated RC10GT**
- 3 Traxxas T-Maxx**

TRUCK



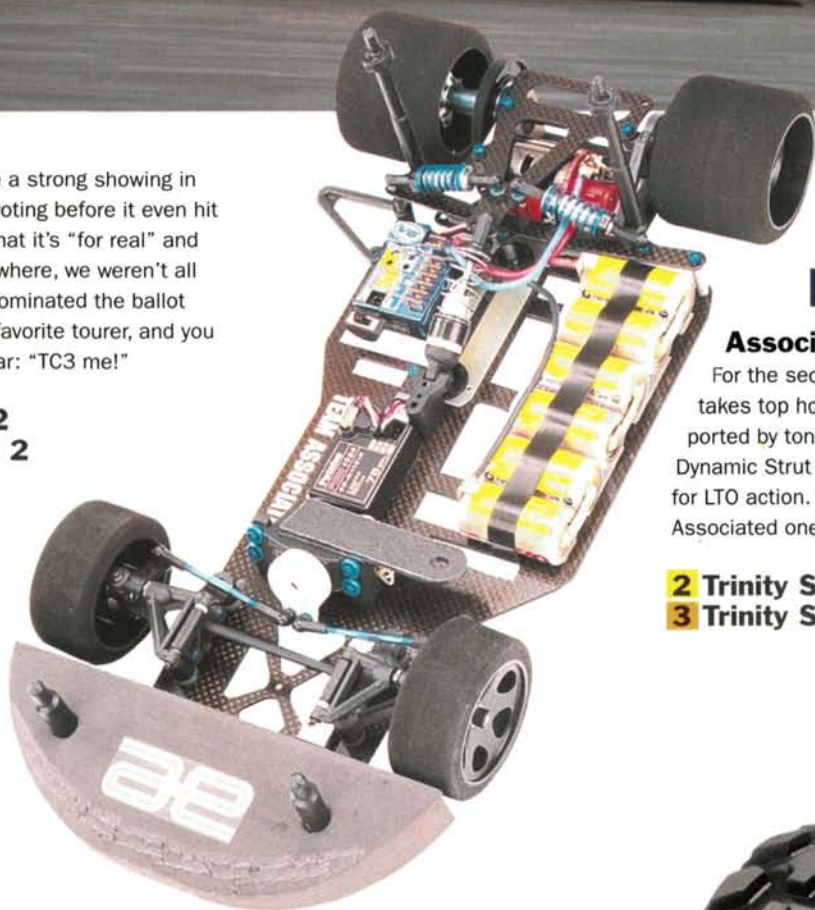
TOURING CAR



Associated TC3

Last year, the TC3 made a strong showing in the "Readers' Choice" voting before it even hit the hobby shops. Now that it's "for real" and racing off shelves everywhere, we weren't all that surprised when it dominated the ballot box. We asked for your favorite tourer, and you responded loud and clear: "TC3 me!"

- 2 HPI RS4 Pro 2
- 3 HPI Nitro RS4 2



PAN CAR

Associated RC10L30

For the second year in a row, the RC10L30 takes top honors. This oval favorite is supported by tons of aftermarket goodies, and its Dynamic Strut front end remains the standard for LTO action. Your votes for the 10L30 give Associated one more reason to be proud.

- 2 Trinity Switchblade 10SS
- 3 Trinity Switchblade 12

TIRE

Pro-Line Dirt Hawg II

Pro-Line hasn't lost this category since we started giving out a tire award in 1997. You guys seem to like to alternate between Pro-Line race rubber and play tires; the Square Fuzzie won in '97, followed by the Dirt Hawg II in '98, the Bow Tie in '99 (it placed second this year), and now you're back to the Dirt Hawg II for 2000!

- 2 Pro-Line Bow Tie
- 3 TRC Foam





MOTOR

Trinity P2K

Trinity has a lock on this category; since the Midnight won in '96, a Trinity stock motor has always taken the top spot. It's the P2K's turn this year, and the copper commando's popularity in the voting is a reflection of its prowess on the track.

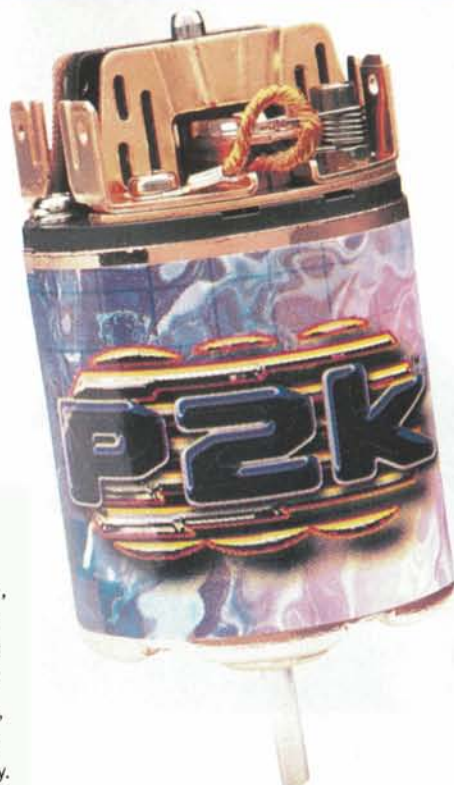
- 2 Trinity D4
- 3 Trinity Speed Gems 2

CHARGER

Novak Millennium

Novak was a strong contender for the top spot last year, but this time, your votes put the Millennium over the top—way over. The full-featured charger is found on the benches of factory pro's and regular guys alike, thanks to its easy operation, super adjustability and NiMH compatibility. Make no mistake: RC Car Action readers like their orange juice.

- 2 Tekin BC112C
- 3 MRC Super Brain



READERS' CHOICE HALL OF FAME

	1996	1997	1998	1999	2000
Buggy	Associated RC10B2	Associated RC10B2	Associated RC10B3	Associated RC10B3	Team Losi Triple-X
Truck	Team Losi Double-XT	Associated RC10T2	Associated RC10T2	Associated RC10T3	Associated RC10T3
Touring car	No award	No award	HPI RS4 Pro	Team Losi Street Weapon	Associated TC3
Pan car	No award	No award	Trinity Switchblade 10	Associated RC10L30	Associated RC10L30
Motor	Trinity Midnight	Trinity Midnight	Trinity Midnight 2	Trinity Paradox	Trinity P2K
Battery	No award	Trinity Sanyo 2000	Trinity VIS EX-tra 2000	Trinity VIS EX-tra 2000	Trinity Panasonic 3000
ESC	Novak Tempest Pro	Novak Cyclone	Novak Cyclone	Novak Cyclone	Novak Cyclone
Transmitter	Airtronics Caliber 3PS	Airtronics Caliber 3PS	Airtronics M8	Airtronics M8	Airtronics M8
Charger	Competition Electronics Turbo 30	Tekin BC112C	Tekin BC112C	Tekin BC112C	Novak Millennium
Tire	No award	Pro-Line Square Fuzzie	Pro-Line Dirt Hawg II	Pro-Line Bow Tie	Pro-Line Dirt Hawg II
Engine	No award	No award	O.S. 12 CV	O.S. 12 CV	Trinity/Picco .15
Body	No award	Protoform RAMbuncious ET	Pro-Line Ford F-150	Andy's Stratus	Pro-Line Silverado
Driver	No award	Brian Kinwald	Brian Kinwald	Brian Kinwald	Brian Kinwald
Innovation	No award	No award	Trinity Midnight 2	Trinity Paradox	Trinity D4

ENGINE

Trinity/Picco .15

In a "Readers' Choice" turnout full of upsets, this might be the biggest upset of all. When Trinity teamed up with Picco, no one thought it would turn out badly, but could anyone have predicted a number-one engine slot for the powerful pair? The .15 Picco powerplant isn't even available yet, but your votes say it's the one you'll be reaching for when the shopkeepers get that magical visit from the UPS guy.

- 2 O.S. Engines CV**
- 3 HPI Nitro Star Pro**



TRANSMITTER

Airtronics M8

Another "Readers' Choice" mainstay, Airtronics has been your favorite since the first awards were handed out. It's year number three for the M8, with no signs of slowing down. With its 10-model memory, easy-to-use, programmable features and comfy offset-wheel design, it's easy to see why you're (ahem) *holding on to the M8.*

- 2 Hitec Lynx 3D**
- 3 Futaba 3PJFS**



ELECTRONIC SPEED CONTROL

Novak Cyclone

This year marks Novak's first win in the charger category, but the company is no stranger to the number-one spot in the ESC category. The Tempest Pro was your pick back in '96, but since then, it's been nothin' but Cyclone. The first—and still numero uno—programmable speed control remains your favorite, and it's still the easiest to program, thanks to the groundbreaking Pit Wizard hand-held programmer. The newest Cyclone is the TC model shown here, which includes special tuning-car profiles.

- 2 LRP IPC V7.1**
- 3 Novak Super Rooster**



BODY

Pro-Line Chevy Silverado

It's the revenge of the truck guys. After being bumped aside last year by the Andy's Stratus, Pro-Line mashed the competition "like a rock," thanks to your votes. The big Chevy is offered to fit the Traxxas, Associated and Losi trucks (and can be trimmed for other trucks such as this ESP Clod), and this no doubt accounts for much of its popularity. That, and it looks awesome!

- 2** Pro-Line Ford F-150
- 3** Andy's Stratus

BATTERY

Trinity Panasonic 3000 NiMH

The innovative Panasonic 3000 NiMH cell changed the face of electric RC, but your votes made it clear that you didn't want your Panasonics from just anyone: you wanted Trinity to match them for you. Will Sanyo's 3K take over in 2001? If it does, odds are they'll still be wearing a Trinity label; you've made Trinity number one every year we've offered the battery category.

- 2** Trinity Sanyo 2400
- 3** Reedy 3000 NiMH



RC INNOVATION

Trinity D4 motor

Replaceable matched magnets. Heat-dissipating, crinkle-finish can. Wind-specific armatures. Pure copper endbell. Surface-mounted capacitors. And that's just the short list of the D4's all-new features! Once again, your votes told us that motor technology defines innovation, and once again, your votes told us that no one innovates like Trinity.

- 2** Traxxas T-Maxx
- 3** DuraTrax RealRace simulator



DRIVER

Brian Kinwald

It's Kinwald by a landslide! The Dirtinator is still the man to beat, and he remains the best-marketed personality in RC. With two IFMAR Off-Road World Champion titles under his belt and countless national victories, there's no denyin' Brian. Believe the hype. ■

- 2** Jukka Steenari
- 3** Masami Hirotsuka

PROJECT

KYOSHO

MP-6

That's
"MP" as in
"Mighty
Purple"

by Kevin Hetmanski



Kyosho's* MP-5/MP-6 platform has been around for a few years now and has won quite a few championships. However, 1/8-scale technology has changed considerably since the launch of the MP series. Nuova Faor* and other companies offer hop-up parts that bring the car up to speed with today's new technology. If you have an MP machine sitting on the shelf and wonder whether you should sell it because it is slightly out of date, stop thinking that! By adding a few choice parts, you can make the car as good as—if not better than—some of today's hottest 1/8-scale off-road racers.

PHOTOS BY WALTER SIDAS

PARTS LIST

NUOVA FAOR

- Radio tray standoffs—part no. K13.
- Front brace—K11.
- Chassis brace (F/R)—K09/K10.
- Shocks (F/R)—A04/A03.
- Front hubs—K20.
- Brake discs—K22.
- Ball-bearing steering—K15.
- Front hub carriers—K21.
- Center diff mounts—K16.
- Motor mount—K12.
- Wheel screws—T16.
- Chassis—K19.
- Rear plate/front plate lower arms—K26/P, K26/A.

PROGRESSIVE SUSPENSION

- 1/8 Piggyback Reservoirs—PRB-2002BL.

MIP

- Shiny CVD kit/MP-5/Inferno DX (F/R)—1211.
- Shiny CVD center drive kit for MP-6—1416.
- MIP 1/8 buggy springs (F/R) (4)—1233.
- Performance clutch kit for MP-5—1255.

GS RACING

- Silicone switch cover—GS-COV01.
- Nylon servo horns (Airtronics)—GS-H00710.
- Aluminum-alloy washers.
- Aluminum-alloy flat-head hex-type screws.
- Super-C silicone fuel tubing.
- Silicone exhaust gasket.

OTHER EQUIPMENT

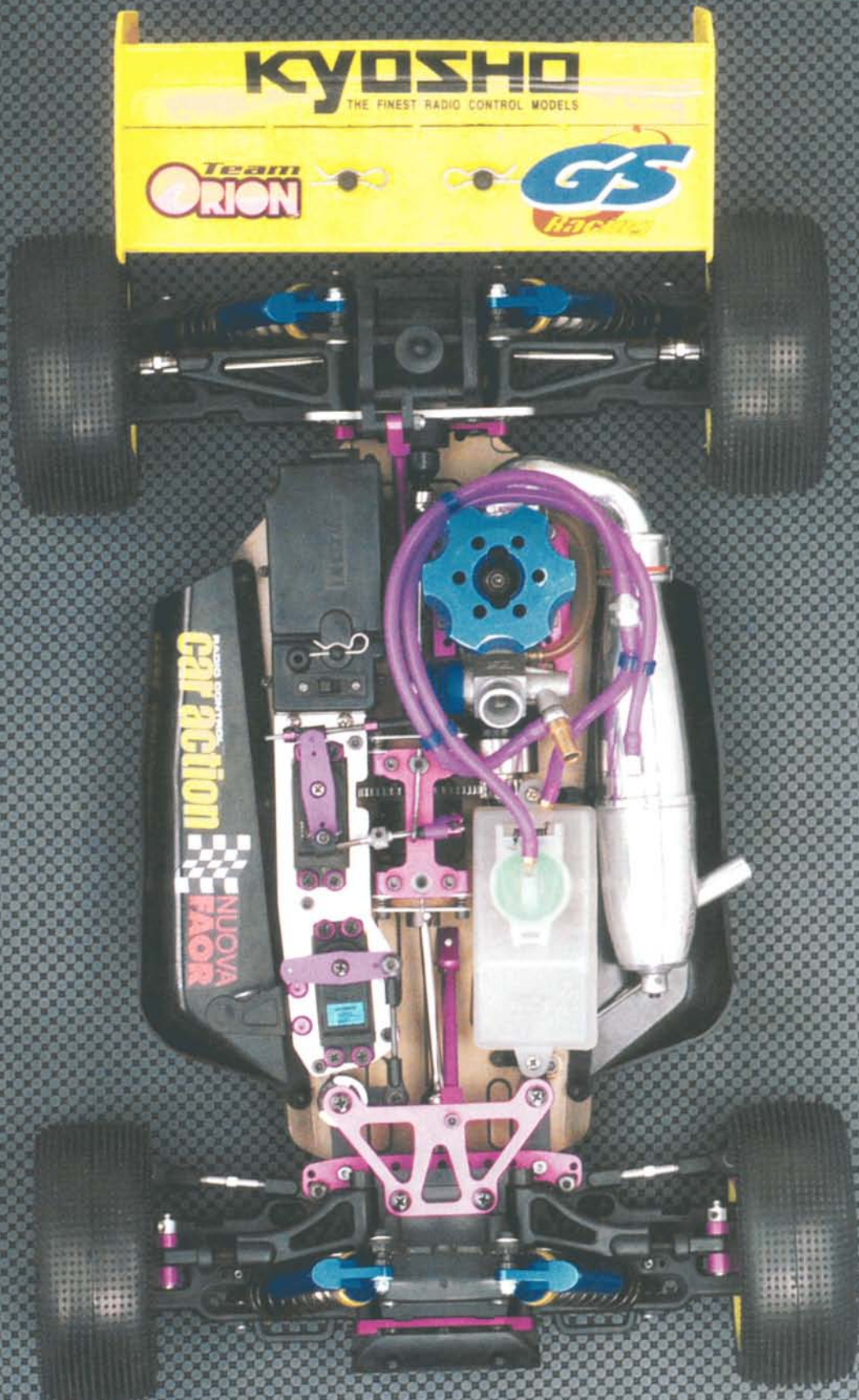
- Protoform Scorchers body—1515-00.
- RB Concepts header and pipe—E1351; 1186P.
- O.S. .21 RZ-V 99 engine.
- Airtronics M8 radio.
- Airtronics servo, steering—94257; throttle/brake—94738.
- Kyosho transponder holder MP-6—KYOC6078.
- Team Orion 1000mAh receiver battery.

BUILDING TIPS

■ Take extra time when building the shocks. I recommend that you remove the seals and pack the shocks with Green Slime*. If you choose not to do this, be sure to check the seal retainer clips to see if they are properly seated.

■ If you set up the car with the long wheelbase, you must replace the rear dogbone with an MP-6 bone. Also, cover the extra mounting holes with tape to prevent dirt from entering the gear case.

■ To further protect the inside of the rear and the front diff housings, apply a little grease where the housings meet the chassis. This will help keep out fine dirt.





These shocks are the bomb. Hard-anodizing makes them ultrasmooth, and the threaded shock bodies make spring adjustment a snap. I replaced the stock springs with ones from MIP. Capping off the shocks are trick Progressive Suspension Piggyback Reservoirs that really add to the shocks' performance.

Suspension. There is nothing wrong with the MP-5's stock shocks, but Nuova Faor's units are better. The shock bodies have been hard-anodized to withstand wear, to make the shocks work smoothly and make them look good. To allow you more precise and easier spring adjustments, the shock bodies are threaded. Just give the shock collar a little twist with your fingers, and you're off and running. The stock springs were replaced with MIP* units.

I also added Progressive Suspension* Piggyback Reservoirs that are screwed to the top of the shocks, replacing the original shock caps. They look cool and also improve the shock's performance. The reservoir is cross-drilled to connect the shock with the reserve chamber, and it allows oil to travel back and forth between the two. A large piece of oil-compensation foam in the reservoir gives the oil a place to go when the shock shaft is compressed. In a race, these reservoirs provide the car with smoother, more consistent damping.

The aftermarket hinge-pin plates on this car serve the same purpose as the stock pieces. The difference is that a setscrew holds the hinge pin in place instead of those pesky E-clips that have a way of falling off at the worst moments.

Steering. A purple aluminum post replaces the stock aluminum servo-saver post. The groove for the servo-saver spring retainer clip is slightly lower on the Nuova Faor post, and this increases the tension on the spring. This post pivots on smooth ball bearings. The kit also includes a set of bearings that replace the bushings in the other steering post. A new drag link replaces the stock link: three holes at each end provide more adjustable steering by letting the link pivot on small ball bearings.

Drive train. Many forces act on an 1/8-scale car's differential, and these will cause the plastic center diff mounts to flex, which, in turn, can cause premature drive-train wear. To reduce the flexing in this area, I added Nuova Faor's two-piece center diff mount. These pieces have been machined from a solid piece of aluminum. The two mounts have been split in two to make differential removal a snap. You no longer have to remove the whole unit from the chassis to take out the center differential. Just loosen the four screws that hold the upper plate and pull out the diff. The brake arms pivot on small bearings in the diff housing and on the top plate. Included small springs space out the brake pads to keep them from rubbing against the brake when you are on the throttle. I replaced the shock center drive bones with MIP center drive CVDs. These high-quality units spin truer and have less slop. They can also be completely rebuilt.

I use Nuova Faor brake discs to slow down this car. These composite discs



This center diff mount is really trick, and allows the diff to be removed without taking the diff mount out of the car. The brake cams pivot on ball bearings, and small springs keep the brake pads away from the disc when you're on the throttle.

are much thicker than stock and give the car smoother braking; these bad boys will make it stop on a dime. I replaced the stock front and rear differential housings with Nuova Faor units. These housings are made to tighter tolerances and allow the ring gear to spin truer.

The stock drive axles have been replaced with MIP shiny CVD units. Just like

the center drives, these axles will run truer than stock, and they are also rebuildable. Their shiny coating helps reduce wear. A large locknut holds the wheels instead of the original large, threaded bolt.

The stock plastic front hub carriers are a weak point. This area is subjected to a lot of stress, and the plastic can flex and might even break. The aluminum Nuova Faor units are much stronger. Nuova Faor has even

spiced things up by fitting the units with ball bearings for the hubs to pivot on instead of bushings. The front hubs on most 1/8-scale cars are made of cast aluminum, which is OK for most types of racing, but when you really start to thrash on your car, cast-aluminum hubs can break. If you crank on the screws that hold them in the hub carriers and are not careful, you can easily strip the threads.



Machined out of a solid piece of aluminum billet, these front hubs and hub carriers are bombproof. Instead of bushings, the hubs pivot on ball bearings that have been pressed into the hub carriers.



When changing from dogbones to universals in any vehicle, MIP is the first company that comes to mind. The wheels are held in place with a large locknut instead of the small bolt used on the original car. The center drives that I used in my car are for the Inferno MP-6. The wheelbase of my car had been made longer, so I needed a longer drive bone.

Machined of solid aluminum, these hubs are light and ultra-tough. Machined aluminum might bend, but it will never break. I doubt you'll be able to bend the suckers! Included with the hubs is a set of high-quality bearings. A part machined from a solid piece of metal is always stronger than a cast part.

Chassis. The Nuova Faor chassis is much thicker than the stock one so it flexes less. To compensate for the extra weight, material has been machined away in low-stress areas, and it has also been hard-anodized to help reduce wear and add strength. Two sets of holes in the rear give you the option of having a long wheelbase like the MP-6's, or a short wheelbase like the MP-5's. The stock front brace has been replaced with a thicker Nuova Faor front brace, and material has been removed to reduce weight.

In a racing chassis, flexing is always bad. The stock MP-5 chassis uses a rear chassis brace but the front doesn't. The stock brace is made of two ball ends attached to a threaded rod. Even with this brace, the rear of the chassis can still flex: the plastic ball ends flex, and the threaded rod can bend. Nuova Faor's front and rear braces for the MP-5 are each made of one piece of machined aluminum, and they are solidly mounted with screws. This setup in the front and the rear makes the chassis stiffer.



The front upper brace is thicker than the original unit. A machined-aluminum rod attaches this upper brace to the chassis, thereby reducing flexing. The Nuova Faor drag link has several mounting holes for the steering rods, and it also pivots on ball bearings.

Engine and accessories. I bolted an O.S.* .21 RZ-V99P engine into the car. This high-end engine has a claimed output of 2.4 horsepower—more than some lawn tractors! I've had luck with O.S. engines in the past, and this one hasn't given me any trouble. For better breathing, I used an RB Concepts* header and pipe. Instead of zip-ties and a rubber coupling, this high-performance pipe and header uses heavy-duty springs to hold the two together. An MIP clutch and flywheel transfer the engine's power to the drive train. The light flywheel allows the engine to reach higher rpm in very little time. Two large clutch shoes are firmly planted against the Nuova Faor plated clutch bell. The plating prolongs the life of the clutch bell's gear teeth.

A Nuova Faor engine mount keeps the engine firmly anchored to the chassis. The bottom plate on this setup is one piece instead of two, and it has slots that allow side-to-side and front-to-back motor adjustments. The two motor-mount blocks have been machined to reduce weight and have holes to accept a variety of motors.

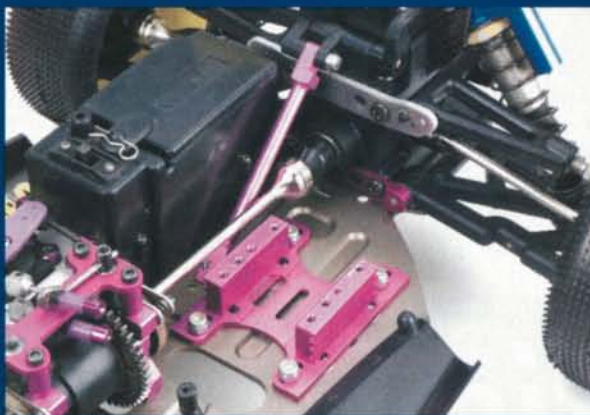
A Picco* fuel tank now holds the fuel in this monster car. The filler hole is slightly larger than stock, and the side fuel fitting makes it easier to attach the fuel line. The fuel filter

inside the tank is a nice feature, as it eliminates the need for an in-line fuel filter, and the tank lid flips in the opposite direction of the stock tank's lid. I filled the tank with 20-percent

O'Donnell Racing* race fuel.



Many people know that MIP produces clutches for 1/10-scale nitro vehicles; they make them for 1/8 scale as well. This monster clutch comes with a new flywheel, two clutch shoes and two large springs to wrap around the shoes. The clutch can be set "light" for progressive engagement, or "heavy" for nearly instantaneous grab.



Just like the rest of the parts, the engine mount is a work of art. Fins machined into its side enhance cooling. Check out the small pivot brace on the bottom of the diff case; it uses setscrews instead of E-clips to secure the hinge pins.

Other goodies. For this buildup, I strapped on a set of Medial Pro* low-profile tires that work well on flat, hard-packed surfaces. Because I run mostly on rougher, loose dirt tracks, I chose to run Pro-Line Bow Tie tires. A GS Racing* universal starter box got my engine up and running without a problem. It is small and light and runs on two standard stick packs. Dead batteries can be charged in minutes with a peak charger. The chassis already looks great with all that beautiful Nuova Faor hardware, but I wanted more; GS Racing hooked me up with all the little doodads I was looking for. I now have fuel tubing, servo arms, screws, washers, an exhaust gasket and a switch cover. You probably guessed it; they are all purple.

To control the car around the track I chose an Airtronics* M8 radio with tons of features that anyone would like. Two nice features for this class of racing are idle bump-up and anti-lock braking. The idle bump-up allows you to set the engine's idle with just a flick of a switch. The anti-lock braking has too many features to list, but let's just say that it's very tunable. Supplying power to the two Airtronics high-torque, high-speed servos is a Team Orion 1000mAh receiver battery. You'll have no problems completing an A-main with this pack. A Protoform* Scorcher body completes the package.

PERFORMANCE

As soon as I pulled out my pretty, tricked-out Inferno at the track, it drew a crowd. On the dirt, it worked well. The stiff chassis allowed the suspension to work to the max. The brakes slowed down this land missile without batting an eye. The longer wheelbase stabilized the car well. Not having to worry about bending or breaking any of the new components gave me confidence and allowed me to concentrate more on racing, and I let it all hang out!

FINAL THOUGHTS

It's almost too pretty to race!—almost. This car will see lots of track time; it's a total blast to drive and very easy to control. Some of these parts may be expensive, but you're unlikely ever to break any. With all of these hop-ups, I can easily hang with—and even beat—some of the latest and greatest rides on the track. Not all of these parts are necessary, but you must admit they're very cool.

*Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

by George M. Gonzalez

GREG HODAPP JOINS THE A-TEAM

National champion Greg Hodapp has joined the Associated racing team and will be competing with all of the A-Team's on- and off-road racing vehicles. Hodapp, a past champion of the Reedy Race and the ROAR and NORRCA nationals, practices regularly at So Cal Raceway in Huntington Beach, CA, and he's been known to tear up the track with his Reedy-powered Associated TC3 touring car. Hodapp will also provide valuable racing feedback to the factory and will travel with the other Team Associated racers to all of the major races. We'd like to wish Hodapp and Team Associated good luck with this new racing partnership.



JOSH CYRUL JOINS LOSI R&D



Reigning Carpet Nats champion Josh Cyrul recently packed all his stuff into his '99 Trans Am and shipped out to California for an in-house position with Team Losi (he must have rented a U-Haul, too; ever tried moving in a Trans Am?). Josh will be a player on Losi's research and development team, and they will surely exploit Josh's world-class driving and setup skills. Team Losi's Gary Keyes put it this way, "Josh brings a wealth of on-road experience and design expertise to our development team, allowing us to bring products to market more quickly to meet our customers' demands." To help balance his heat-of-battle RC experience, Josh plans to hit the books. "I'll be learning all the mechanical engineering and design programs Team Losi uses, and I'll be taking basically every class I can that relates to the physics and design of RC vehicles. It should be cool." Could Josh be hard at work on a new Street Weapon? "We're always working on something," was the answer. Hey Josh; if you see an unmarked van outside your office with a long lens sticking out the window, don't worry about it.

Kinwald takes Mod Truck, 4WD classes at 14th Cactus Classic

The 14th annual Cactus Classic, held this past spring at Scottsdale RC Speedway in Scottsdale, AZ, turned out to be the second-largest event in Cactus history; there were more than 430 registered entries. The weather couldn't have been better for racing; drivers and spectators were treated to comfortable temperatures that remained in the mid-70s throughout the course of the event. Team Trinity factory driver Brian Kinwald was the overall winner of the Mod Truck and 4WD Mod classes, while his teammate Matt Francis cleaned up in 2WD Mod. Ryan Maifield drove his Associated B3 to victory in the 2WD Expert Stock class; Jerry Walter secured the win in Expert Stock Truck. Nick Sava and Matt Davis won the 2WD Stock and Truck Stock classes, respectively. We'll provide complete coverage of the 14th annual Cactus Classic in the next issue of *RC Car Action*.

Tamiya TB-01 Pro?

Many Tamiya enthusiasts have discovered that the new, shaft-drive TB-01 chassis is a competitive touring car after it has been fitted with a few key hop-ups. Tamiya plans to release many new drive-train and suspension hop-ups for this car, and it may even release a full-blown TRF (Tamiya Racing Factory) version, depending on the demand. A sealed ball-bearing kit, aluminum-motor heat sink and motor mount, lightweight carbon-fiber-composite chassis, propeller shaft and spur gear will soon be available. Galvanized metal diff gears and lightweight aluminum pinion gears will also be available, but expect many more hop-ups down the road. If you would like to see a TB-01 TRF version that includes many of the available hop-ups, let Tamiya know; contact the customer service department at (800) TAMIYA-A, or log onto the website, www.tamiya.com. Tamiya is asking you to make the call, so let them know what you think.

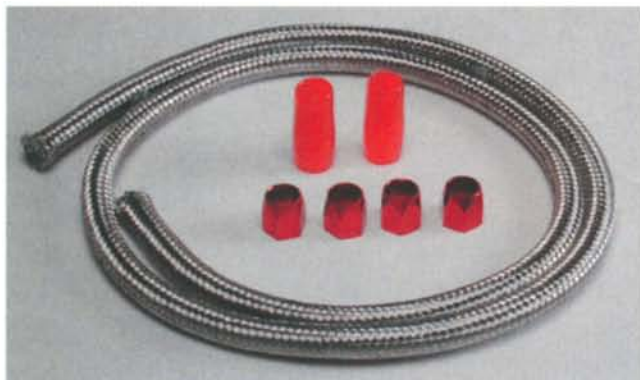


Will the stock TB-01 chassis have a TRF stablemate?

SPEED SHOP

M. Speed Stainless Mesh Silicone Tubing

Even though there is no official U.S. distributor for this product, I just couldn't resist showing it to you. If you're looking for that finishing touch for your nitro rig, this is it. M. Speed's Stainless Mesh Silicone Tubing looks just like the braided fuel and oil lines that are available for full-size hot-rods and custom cars. High-



quality silicone tubing is used under the stainless steel braiding for proper fuel delivery, but the braiding does serve a purpose: it protects the tubing from excess heat and "pinching" that can cause small, undetectable pinhole leaks. The braiding is sold in approximately 24-inch lengths and includes colored-anodized-aluminum connectors that secure the line to the fuel tank's pickups. I found this product at California R/C Raceway in Anaheim, CA—known for stocking many exotic Japanese tuning parts.

M. Speed Stainless Mesh Silicone Tubing—part no 02-218, under \$25.

Factory Team Reamer

Here's a tool that you're going to want in your toolbox. Unlike other reamers, the Factory Team* Body Hole Reamer is compact, razor-sharp and has a replaceable tip. The reamer is made from machined aluminum and features a cool, blue-anodized color that matches many of the Factory Team hop-ups available for Team Associated vehicles. Also unique is the machined-aluminum, screw-on cap that prevents the blade from banging around in your toolbox and damaging the carbide tip.

Factory Team Body Hole Reamer—1594, \$22.



Penguin R/C Graphite Brake Discs

Many of Penguin R/C's* fine graphite components have been featured in this column and elsewhere in the magazine, and I'm sure that everyone who has purchased the company's products has been as impressed as I have. Well, Penguin now offers graphite brake discs for many of the popular nitro vehicles currently available. The Penguin Performance Brake Discs provide more efficient braking and quicker break-in through the use of textured graphite plates. I installed one of Penguin's graphite brake discs in my HPI Nitro RS4 and found that they "grab" better and fade less than even the optional fiber composite disc brake. If you're serious about racing, you'll want to install the Penguin Performance Disc Brake in your nitro rig.

Penguin R/C Performance Brake Disc—P2700 (Tamiya TG10, TGX and Mad Bison), \$6.99; P3710 (all HPI nitro vehicles), \$5.99; P5700 (Associated RC10GT), \$3.99; P6700 (Traxxas Nitro 4-Tec, T-Maxx), \$3.99.



HPI Race fuel

Racers who like to be loyal to one particular brand are going to be very pleased that HPI* now offers nitro fuel with its logo printed on the label. Made exclusively by Wildcat R/C Fuel, HPI's new Power Fuel is perfect for all nitro-powered cars and trucks. The fuel is made with Wildcat's custom-formulated, 14 percent synthetic/castor oil blend for extended engine life and reliability, and it's available in 20- and 30-percent nitro blends. The fuel is available in handy quart-size bottles and should be on your hobby dealer's shelves by the time this goes to press. According to HPI, this fuel is not for model airplanes and helicopters, but model boat racers will like it just as much as RC car enthusiasts.

HPI Power Fuel (20%)—74318, \$10.

HPI Power Fuel (30%)—74320, \$12.

SPEED SHOP

IRS 1/12-scale pan car and Associated TC3 upgrades

Here are a few little doodads from IRS*. No, not the Internal Revenue Service—Irrgang Racing Service! The polished aluminum pieces are for all you 1/12-scale guys out there. They've been machined out of light-weight, aircraft-grade aluminum. Extra material has been removed from these three-hole hubs to make them lighter than the stock hubs used on most cars. The blue parts are for the Associated TC3; they replace the drive cups and spur-gear adapter. They are also machined out of light-weight aluminum and have been anodized a cool blue.

Right-side, three-hole, 1/12-scale hub—part no. IRS124, \$18.

Three-hole, 1/12-scale, clamping hub—IRS219, \$19.50.

TC3 drive cups—IRS143, \$17.50.

TC3 spur adapter—IRS144, \$20.



Megatech tuned-exhaust system for HPI cars

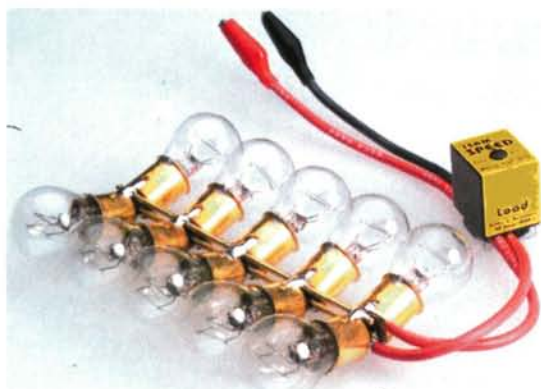
Megatech* now has direct-replacement, tuned-exhaust systems designed specifically for HPI cars. They may be used with or without pull-start engines. An adapter is bolted onto the engine to convert it to a round port exhaust such as the ones found on big-block .15- and .21-size engines. The header is held onto the engine by a large spring that is wrapped around the engine block. A thick, silicone exhaust gasket creates a tight seal between the exhaust adapter and the header. Standard tuned-exhaust systems for 1/10-scale cars use a silicone coupling to attach the header to the pipe. In this unique system, the end of the pipe fits inside a flange at the end of the header. An exhaust gasket similar to the one used at the engine block also seals the header and pipe connection. The two are held in place by three tight springs. Two systems are offered; one gives your car maximum top speed (shown assembled), and the other gives the engine lots of torque (shown disassembled).

Tuned exhaust system for HPI cars—MTC16SA100 (top speed)/MTC16SA101 (high torque); \$39.95 each.



Racer's Edge shock piston drills and bulb discharger

This high-quality, shock-piston-drilling kit from Racer's Edge* is small enough to fit in any toolbox. These drill bits are perfect for fine-tuning your shock pistons at the track. The drill bits



are attached to a round piece of knurled aluminum that serves as a handle. No special tools are needed to use them; just your fingers will do. The bits are available in size numbers 54 through 59, or in a complete kit such as the one shown here.

Racer's Edge also offers this handy light-bulb discharger with 10, 2A light bulbs connected in series to give you a 20A discharge rate. The discharger attaches to the battery with two alligator clips. To prevent the battery from being over-discharged, there is a small auto cutoff regulator in between the clips and the bulbs that will switch off the discharger when the pack reaches approximately 5.4 volts.

No. 54-59 drill and handle kit—RE7060, \$8.50.

Auto cutoff unit with light bulb—RE709, \$35.99.



5 QUESTIONS

Age: 20
Home track: SoCal Raceway, Huntington Beach, CA
First RC car: Original HPI RS4
Sponsors: HPI, Orion



Thad Gardner
TEAM HPI

RC Car Action: How's everything going at HPI? What are some of your job responsibilities and goals?
Thad Gardner: Things are going great for me at HPI. I'm responsible for all customer service work, engine repairs and troubleshooting. I spend a lot of time talking to customers over the phone, helping them with various technical problems.

RCCA: So, you're the guy with all the answers, huh? What's your favorite thing to do at work? Are there any chores you're not particularly fond of?

TG: Building and testing new products is what I enjoy the most; I regularly test new products. I like to torture them to see if I can spot any potential weak spots that might give our customers problems. Some of the engine repairs can be tedious, though.

RCCA: You're a really fast driver; how long did it take you to become such a proficient racer? What are the most important aspects of going fast?

TG: I've only been racing for three years, but I've gotten faster every year by practicing often and applying some of the knowledge that I've picked up along the way. There's nothing more helpful than practice. I try to race at least twice a week. I've found that competing at different tracks against different drivers can only make you faster. The one thing you don't want to do is get locked into one track. Try as many things on the car as possible. Most cars are tunable; don't be afraid to make adjustments, but remember how each change affects the vehicle.

RCCA: What do you enjoy most about racing? Which drivers do you particularly like to compete against?

TG: I enjoy the camaraderie at the track, and working on my car, trying different things. Barry Baker is always good for some racing drama, as are Dave Loftin and Jimmy Jacobson. These guys are great to be around, and they're extremely helpful.

RCCA: In our "Last Lap" question, we ask whether GT1-style bodies should be legalized for sanctioned racing. What's your take on this question?

TG: I would rather see a separate class for that body style. Super-scale nitro cars such as our HPI Super Nitro RS4 and the Kyosho SuperTen and Tamiya TGX would be perfect for GT1-style bodies. I feel that 1/10-scale touring cars should stick to sedan bodies.

UNDER THE HOOD

THAD'S **HPI NITRO RS4 2**

Naturally, Thad runs HPI's NovaRossi-based engine. Heat-sink motor mounts keep it in place.



Above: aluminum standoffs support the foam bumper.

Right: Thad had to slightly modify this Pro 2 graphite shock tower to fit the Nitro RS4 2.



MODIFICATIONS

Thad replaced the front camber links with upper arms borrowed from the RS4 Pro 2 electric vehicle. He also installed 2-degree upper and lower suspension-arm mounts to alter the vehicle's kick-up. The result is a stiffer front end that's more flex-resistant, and this makes the car more stable in the turns and feel less twitchy. Thad also installed Pro 2 graphite shock towers (part no. 73006, front; 73007, rear). The installation of the Pro 2 rear shock tower required new body-mount holes to be drilled 6mm behind the stock body-mount holes.

EQUIPMENT

BODY: HPI BMW 328ci
SERVOs: Airtronics 94258
RADIO: Airtronics M8
TRACTION ADDITIVE: None
RECEIVER: Airtronics
RECEIVER BATTERY: Team Orion 1000mAh NiMH 5-cell hump pack
TIRES: HPI 33R slicks
INSERTS: HPI Pro Molded (firm)
GEARING: 44/15
ENGINE: Nitro Star Pro 12 RSC

HIGH-BITE ASPHALT SETUP

	FRONT	REAR
Caster/squat	10°	Stock
Camber	1°	1.5°
Toe-in/out	1° out	2° in
Ride height	4.5mm	5mm
Shocks		
—fluid	45WT	40WT
—piston	No. 5	No. 4
—spring	Blue	Yellow
—limiters (inner/outer)	None	None
—mounting location (upper/lower)	6/A	3/A
Camber-rod location (outside)	No. 1	No. 2
Swaybar	None	None

FACTORY OPTIONS

■ Nitro super chassis—part no. A903 ■ Gear-brace set—A907 ■ Graphite rear brace—A935 ■ Graphite upper deck—A934
■ Pro 2 graphite front shock tower—73006 ■ Pro 2 rear shock tower—73007 ■ Nitro racing clutch—A885 ■ Fiber disc brake—A844 ■ Tuned pipe and header—A970 ■ 39T ball diff (2)—A905 ■ Turnbuckle set—A502 ■ 15T clutch bell—A815
■ Heat-sink motor-mount—A920 ■ Lightweight flywheel—A926 ■ Rear nitro handling kit—72515



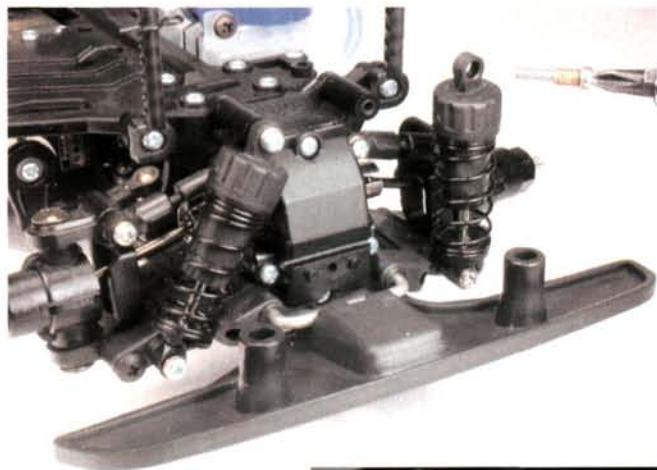
HOT MOD HOW TO

TAMIYA STEERING AND SUSPENSION-SLOP FIX

Do you want to remove some of the steering and suspension slop from your TG10, TA03, or other Tamiya vehicle? Tamiya offers a bushing and ball-connector set (part no. 53144) that includes metal bushings (sleeves) and machine screws that are designed to replace the ill-fitting step screws that secure the upper links, steering arms and silicone O-rings that you install between the ball joints and ball cups. This kit is well worth its low price and is easy to install, as you will soon find out.

■ **STEP 1.** Remove the upper links from the vehicle and chuck the step screws into the trash. If you have a TA03 tub-chassis vehicle, remove the step screws that secure the steering arms and bellcrank system. We're using a stock TG10 touring car as our subject.

■ **STEP 2.** Slide the sleeves over the 3x12 machine screws



and reinstall the upper links on the vehicle. Do the same to the steering bellcrank system on your TA03.

■ **STEP 3.** Now we're going to use the silicone O-rings that are included with the bushing and ball-connector set. These need to be installed between the

ball studs and ball cups as shown in the photo. Eight O-rings were installed on the steering system of our subject vehicle. Do not install O-rings on the optional touring and rally-car adjustable upper-link set because the O-rings will bind the suspension system. You've now removed most of the slop, and you'll be able to tune the vehicle more accurately.



*Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

LAST LAP

Should ROAR allow GT1-style bodies in sanctioned touring-car racing?

I'm against allowing GT1-style bodies in sanctioned racing because they clearly provide an aerodynamic advantage over standard touring-car bodies. Everyone will start using the GT1 bodies, and soon, we won't have a touring-car class any more. Besides, the GT1-style bodies closely resemble the bodies used on pan cars, which have become standard on these types of vehicles. Let's not make matters more confusing, OK?

—Simon Greenbaught

Tamiya offers a GT1 class in its Championship Series for cars that use these types of body shells. I think these bodies look much more realistic than many of the racing-oriented sedan bodies, and the cars handle better with them, too. I think it would be OK to run GT1-style body shells, as long as these cars are raced in a separate class, as in the TCS.

—Richard Gonzales

I love GT1-style bodies; I think they look a lot cooler than sedan bodies. That's why I race Tamiya vehicles. I compete at California R/C Raceway in Anaheim, CA, and they allow the racers to choose whichever body they want. I think that talent is more important than the type of body you have on your car, so any complaints about unfair advantages because of the use of a GT1-style body is absolutely ridiculous.

—Mike Ebstien

I don't compete in sanctioned racing, but if I did, I would want to compete on an even playing field. I can't honestly say whether GT1 bodies offer a noticeable advantage, but if they do, they shouldn't be allowed at large national championship events. We have enough to consider when dialing in our cars; we can do without having to worry about "the body of the week."

—Steve Demestre

Are those GT1 bodies going to fit over the shock towers? They sound cool for pan sedans, but I think we'll wind up with some weird-looking compromise shapes for 4WD touring cars. Keep it simple and stick with sedans.

—Frank Norton

NEXT MONTH'S QUESTION

Should ROAR offer a Sportsman national championship for non-sponsored racers?

Email your responses to
gregv@alrge.com.
Type "Last Lap" in the subject box.

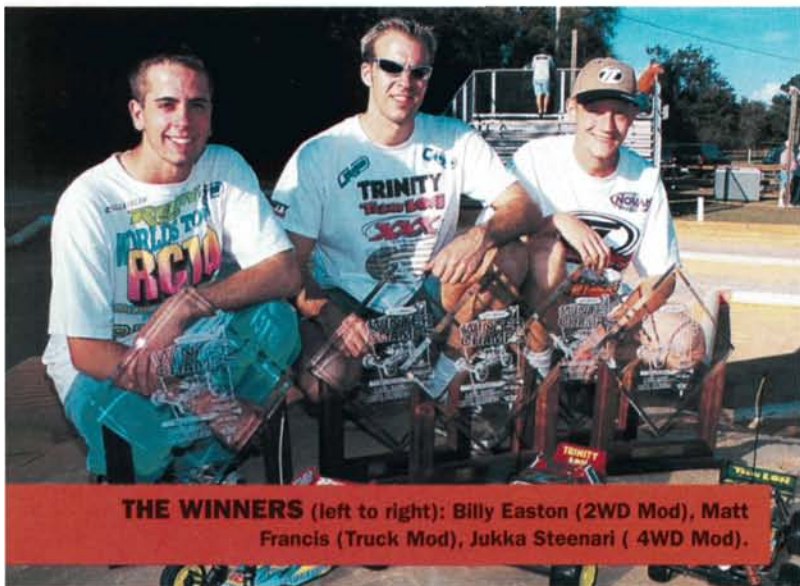
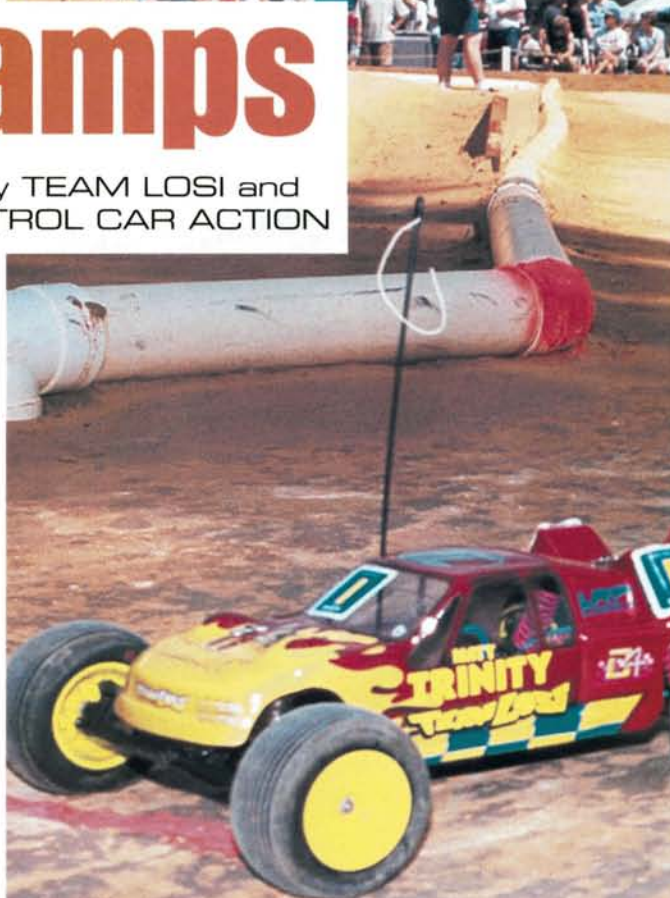
Florida Winterchamps 2000

Sponsored by TEAM LOSI and
RADIO CONTROL CAR ACTION

by Peter Vieira

If you're anything like me, when you play the "If I won the lottery" game, there's always a plan to build an awesome RC track. It would have a two-story drivers' stand with an enclosed announcer's booth and scoring room and plenty of space for sign-ups and car tech. There would be bleachers for spectators, and the track would be big enough for wide-open racing action but not so big that you couldn't see where you were driving. Of course, the whole deal would be built somewhere lush and sunny year-round—like Tampa, FL, for instance.

I don't know if they have any instant millionaires in the West Coast RC Club, but that's just the type of facility the club has built in Tampa's beautiful Lake Park. With its scenic surroundings, racer-friendly layout and challenging track, the West Coast RC Club set the stage for another exciting Winter Champs (oh, yeah; Team Losi and Radio Control Car Action helped out, too). For off-road fun in the sun, this was the place to be.



THE WINNERS (left to right): Billy Easton (2WD Mod), Matt Francis (Truck Mod), Jukka Steenari (4WD Mod).





First race, first win for the Triple-XT



1. Jukka Steenari wrenches on his Triple XT. See? He doesn't just race four-wheel.
2. Ryan White, the Winterchamps' youngest A-main driver, gets an autograph from trophy presenter Tara Wagner: "So, Tara, are you busy Saturday night ten years from now? Let's hook up."
3. Greg Degani put his Kyosho Ultima ST Type R into the stock A-main but tanked when he put in a dead pack. It happens to the best of us.
4. Billy Easton looks pretty happy in this shot, and he hasn't even won Two-Mod yet! It was easy to have a good time in the Tampa sun.
5. Matt's trophy should have included some CA!

FORMAT CLASSES

- 2WD Stock with Reedy Rage handout motors
- Truck Stock with Reedy Rage handout motors
- 2WD Modified
- 4WD Modified
- Truck Modified

QUALIFYING

Three quals were run for each class, and points were awarded for each qualifier according to time (zero for the fastest time, 1 point for second, 2 for third, etc.). Each driver's worst run was dropped, leaving the best two quals to determine the starting order in the Mains.

THE MAINS

The Stock classes ran a single A-Main, while the mod guys ran Triple-As for points. As in qualifying, the worst score was dropped, leaving the two best finishes to determine the finishing order. If a driver won his first two Mains, his points lead was insurmountable, and he was allowed to sit out the third Main if he wished.



Either Greg Hodapp just drank a bottle of Losi 20WT oil, or he had a snow cone—one or the other.



THE TRACK

No one wants to see Michael Schumacher run around an oval, Jeremy McGrath tool around a flat track, or Shaun Palmer ride a mountain bike uphill. Likewise, when off-road RC's hottest drivers get together for a major event, you don't want to see them squirting around a roadcourse with one jump. I'm happy to report that the West Coast RC Club delivered a challenging circuit that provided plenty of air time combined with a consistent blue-groove surface. A long front straight allowed the cars to open up, but the rest of the track was nothing but tight turns (some off-camber), double jumps, step-ups and triples. Here's what some of the drivers said about the track:

MATT FRANCIS, TEAM LOSI

It's excellent. I like all the tight 180s. The jumps are good; you can hit them anywhere and clear 'em. There's a little bit of dust on the inside line, but if you stay in the groove, you're set.

JASON RUONA, TEAM LOSI

I think it's good; it's one of the better layouts they've had—definitely better than last year's track.

BILLY EASTON, TEAM ASSOCIATED

This is the best layout I've ever raced on here. I like the way the track flows around; there's lots of jumps; it's a lot more technical than it has been in the past. They did a good job on the dirt this year, too.

CHRIS TOSSOLINI, YOKOMO

I think it's pretty easy; traction's good—well, not easy. The triple is hard, but the rest of the track is fun. It's probably the best off-road track I've been to. I wish the jumps were even bigger.
Editor's note: see? You get these on-road guys in the dirt, and all they wanna do is jump.

JR MITCH, SCHUMACHER

I love it. It's a lot more fun; the cars are in the air more than they are on the ground. It's more of a "timing" track, and I like that.

THE ACTION

2WD Stock

• **Qualifying.** Jared Scott did Schumacher proud with a pair of wins for the TQ spot. Robbie Boles took 7 points into the second qualifying position, and Brian Westerman earned the three spot.

• **A-Main.** Two-stock looked as if it was Jared Scott's race. His Schumacher buggy was dialed and looked every bit the TQ machine that it was. Tragedy struck in lap 5, however, when his transmission detonated. Jay Robinette took advantage of the situation to take over first place, while Brian Westerman hung back in second with Robbie Boles behind him; and that's how they finished.

Truck Stock

• **Qualifying.** Jay Robinette was top dog and posted a pair of wins in the second and third quals. Jared Scott's 5 points gave him the second qualifying position, and Josh Knight tossed out a bad heat to take 5 points onto the third spot on the grid.

• **A-Main.** Top-qualifier Jay Robinette opened up his stocker-than-stock Triple-X and held on to the pole position with Josh Knight a scant $\frac{1}{10}$ second behind. Josh caught Jay on lap 5, leaving him to battle with third-place driver Dan Rodriguez. Robbie Boles overtook Dan on the final lap, but the front-runners held their spots, giving Josh Knight the Stock Truck title.

2WD Modified

• **Qualifying.** Matt Francis had 7 points, but that was still good enough for TQ. Mark Pavidis was behind him with 9, and Brian Kinwald started from the three spot.

• **A1.** Brian Kinwald "only" qualified third in Two-Mod, but he was smoking in the first qualifier. It was Brian's race to lose, as he lead every lap comfortably—until lap 6, that is, when his Triple-X inexplicably slowed and pulled off the track. Brian's pinion had come loose, leaving his Trinity D4 powerless to propel his machine. Even the mighty can be brought low by a setscrew. Billy Easton cruised in for the win with Scott Brown and Mark Pavidis in tow.

• **A2.** Matt Francis maintained his TQ lead for the first three laps but broke when he piped his car. Kinwald took over to keep a Triple-X up front, while Mark Pavidis and Billy Easton kept Associated in the hunt. Mark almost overtook Brian when Kinwald rolled his Triple-X, but Mark also bobbled, and the lineup wasn't changed. Easton and Pavidis eventually swapped places, but Kinwald could not be moved from the top spot and took the win at the tone.

• **A3.** All the marbles were still on the line for the third main, and living legend Rick Hohwart was driving like a man with something to prove. He took the lead from a fourth-place start, with Mark Pavidis and Jason Ruona (in his Team Losi debut) close behind. Mark made his move in lap 3 to get around Hohwart and take the win with Kinwald in third, but the big story was Billy Easton: the points for his one-two finishes in the first two Mains weren't topped by any other driver, and the overall victory was his.



Unlucky Lucky

MEET LUCKY BATTLE, from the A-Train Race Team out of Huntsville, AL. Lucky qualified dead last in Stock Truck and Stock Buggy after DNS'ing in the first two qualifiers in both classes (hey, at least he's consistent). Lucky was smiling by the end of the G-Main though; he took home these snazzy plaques for his first-place finish in Buggy and third place in Truck! Actually, Lucky was smiling even before the Main. If you want to see a picture of guy who knows how to have fun no matter what, you're looking at it.



4WD Modified

• **Qualifying.** Two wins equaled first place for Jukka Steenari. Jimmy Jacobson's two points put him on the grid in second, and Brian Kinwald launched into the Mains from third.



• **A1.** Jukka Steenari was a force to be reckoned with in Four-Wheel, and he posted qualifying times that were as much as 4 seconds faster than the next fastest machine. Jukka blasted off at the start tone and held off Brian Kinwald, who moved into second from third at the start of the race, and Todd Hodge moved into third after a single lap in his fourth-place qualifying spot. The Steenari/Kinwald/Hodge Losi locomotive churned through nine laps to finish in that order.

• **A2.** Jukka—the man. Start to finish, no one even challenged him. Brian Kinwald didn't budge from second, and third was held by Todd Hodge for the first half of the race and Rick Hohwart for the last. That's how they finished, and Jukka was ready to pack up his gear when he crossed the line.



This is what it's like to be a factory driver: cars on the bed, parts everywhere and tons of tires to glue. Jared Scott, livin' the life.

After winning the first two Mains without giving up as much as a single lap, he was the



undisputed Four-Wheel Winterchamp.

• **A3.** With Jukka out of the program, Brian Kinwald had free reign over the third Main—well, almost free: he still had to get around Jimmy Babcock, who bravely kept him at bay for half the race. Kinwald worked his Dirtinator magic move into first, while Jimmy held on to second and held off Todd Hodge in third. That's how they finished.

Truck Modified

• **Qualifying.** Matt Francis was TQ with 2 points. Associated's Scott Hughes brought 4 points to second, and Brian Kinwald grid-ded third with 5 points.

• **A1.** Top qualifier Matt Francis kept his Triple-XT up front for the first lap, but



Associated's Scott Hughes got around him for the next two. Francis was not to be denied, and he got back into the lead by the fourth lap. Matt held off the likes of Brian Kinwald and Billy Easton to take the first Truck Main.

• **A2.** Matt Francis could only hold off Scott Hughes for the opening lap, but he reclaimed the lead after a rubbin's racin' touch with Scott that bumped him into third and opened the door for Jimmy Jacobson to challenge Francis. Kinwald was raging in the third spot but couldn't make a move into second. Matt kept his Triple-XT up front to take the win (you know Team Losi was psyched—this was the new truck's debut race) and secure the Mod Truck title in the process. With back-to-back A-main wins, Matt could sit out the third Main.

• **A3.** Matt Francis already had the Championship win, but the rest of the field still had something to prove. Brian Kinwald and Billy Easton battled during the second half of the race, but Brian was a man on a mission and made a nine-lap run on full afterburner to take the win and second place overall.



The West Coast RC Club did a great job of keeping the action running smoothly and hooked me up with a T-shirt and hat. Yesss!



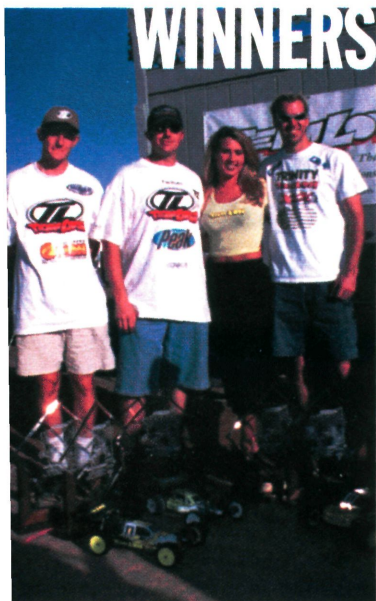
There are two things you're sure to find at any RC event: big dudes and fried foods.

BARRY BAKES THE TIRES

What do RC racers do when they've finished racing for the day?—go race something else, of course. I provided the rented wheels for a trip to Malibu Grand Prix with Yokomo's Barry Baker and Chris Tossolini and Schumacher's Jarred Scott. The Malibu cars are sweet; they have full suspension, pretty good squirt and get loose in the turns. The lighter you are, the faster they go, so it was a surprise to see the big man, Barry Baker, post the fastest laps despite a lower power-to-weight ratio. His secret? "I don't let off."



WINNERS



FIN.	QUAL.	DRIVER	VEHICLE	MOTOR	ESC	TRANSMITTER	BATTERY	TIRES (F/R)	GEARING
2WD MODIFIED									
1	5	Billy Easton	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
2	2	Mark Pavidis	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
3	3	Brian Kinwald	Losi	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
4	8	Lloyd Dassonville	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
5	10	Scott Brown	Losi	Trinity	Novak	JR	Trinity	Losi	—
6	7	Jason Ruona	Losi	Trinity	Novak	Airtronics	Trinity	Losi/Pro-Line	96/25
7	6	Dave Montgomery	Losi	GM	GM	Airtronics	GM	Losi/Pro-Line	23/78
8	4	Rick Hohwart	Losi	Peak	Novak	Futaba	Peak	Losi/Pro-Line	82/22
9	9	JR Mitch	Schumacher	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
10	1	Matt Francis	Losi	Trinity	LRP	Airtronics	Trinity	Pro-Line	24/92
4WD MODIFIED									
1	1	Jukka Steenari	Losi	Orion	Novak	Airtronics	Orion	Losi	—
2	3	Brian Kinwald	Losi	Trinity	Novak	Airtronics	Trinity	Losi	—
3	4	Todd Hodge	Losi	Trinity	GM	Airtronics	Trinity	Losi	—
4	2	Jimmy Jacobson	Losi	Orion	Novak	Airtronics	Orion	Losi	86/18
5	9	Rick Hohwart	Losi	Peak	Novak	Futaba	Peak	Losi	84/18
6	6	Brian Dunbar	Losi	GM	GM	Airtronics	GM	Losi	—
7	8	Marcus Luebke	Schumacher	Orion	CS	Airtronics	Orion	Pro-Line	16/89
8	10	Travis Amezcua	Losi	Orion	Novak	Airtronics	Orion	Losi	86/18
9	5	Matt Francis	Losi	Trinity	LRP	Airtronics	Trinity	Losi	100/21
10	7	Chris Bing	Losi	Trinity	Novak	Airtronics	Trinity	Losi	84/18

SPEC TIRES FOR WINTERCHAMPS 2001?

As the primary sponsor of the Winterchamps, Team Losi definitely has cred when it talks about changing the shape of RC competition—especially when it's Gil Losi Sr. doing the talking.

Gil was quick to credit the West Coast RC Club with putting on a fine event but was concerned about the shortage of "regular" guys in the stock-class ranks, which were full of sponsored drivers.

Gil feels the problem stems from the inability of average racers to compete with the sponsored guys—not because they lack talent, but because they lack resources: "I want the stock racer to feel like he has a chance to win. He shouldn't have to compete with a sponsored driver running equipment that he can't even buy. And even if the factory drivers are using available equipment, they have an advantage because they have nearly unlimited

THE POWER...



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- Aluminium wheel-adaptor set front/rear, fixed (extra)
- Conical wheel-shim set front/rear
- Carbon shock support rear and ball-type shockmounting-set
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The Vector 1/8-scale R/C car takes gas racing performance to new extremes. Vector, the pinnacle in RC racing technology, setting new standards in RC engineering, styling, quality and performance. Original design, others follow...

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- 1999 ROAR National Champion

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FIN.	QUAL.	DRIVER	VEHICLE	MOTOR	ESC	TRANSMITTER	BATTERY	TIRES (F/R)	GEARING
TRUCK MODIFIED									
1	1	Matt Francis	Losi	Trinity	LRP	Airtronics	Trinity	Losi	100/18
2	3	Brian Kinwald	Losi	Trinity	Novak	Airtronics	Trinity	Losi	—
3	9	Billy Easton	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
4	6	Jimmy Jacobson	Associated	Orion	Novak	Airtronics	Orion	Pro-Line	87/19
5	2	Scott Hughes	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
6	5	Adam Drake	Losi	Trinity	Novak	Airtronics	Trinity	Losi	—
7	10	Greg Hodapp	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	—
8	7	Jason Ruona	Losi	Trinity	Novak	Airtronics	Trinity	Losi/Pro-Line	98/27
9	8	Mark Francis	Losi	Trinity	LRP	Airtronics	Trinity	Losi	—
10	4	Rick Hohwart	Losi	Peak	Novak	Futaba	Peak	Losi	88/17
2WD STOCK									
1	4	Jay Robinette	Losi		Novak	JR	Pro Parts	Losi/Pro-Line	82/24
2	3	Brian Westerman	Losi	H	Novak	Airtronics	World Class	Pro-Line	82/21
3	2	Robbie Boles	Losi	A	Novak	Airtronics	—	Pro-Line	92/26
4	6	Trey Scott	Losi	N	GM	Airtronics	GM	Pro-Line/Losi	—
5	9	Todd Lewis	Losi	D	GM	Airtronics	Trinity	Losi/Pro-Line	78/24
6	10	Scott Haake	Losi	O	LRP	Airtronics	—	Pro-Line	—
7	8	Charlie Perez	Losi	U	Novak	Airtronics	World Class	Pro-Line	84/28
8	5	Keith Manton	Losi	T	Novak	Airtronics	Trinity	Losi/Pro-Line	—
9	7	Jinson Collins	Losi		Novak	Airtronics	Orion	Pro-Line	78/21
10	1	Jarred Scott	Schumacher		LRP	Airtronics	Reedy	Pro-Line	95/19
TRUCK STOCK									
1	3	Josh Knight	Associated		GM	Airtronics	Reedy	Pro-Line	90/19
2	1	Jay Robinette	Losi	H	Novak	JR	Pro Parts	Losi/Pro-Line	88/18
3	8	Robbie Boles	Losi	A	Novak	Airtronics	—	Losi/Pro-Line	87/19
4	7	Dan Rodriguez	Associated	N	LRP	Airtronics	Orion	Pro-Line	87/19
5	10	Brian Westerman	Losi	D	Novak	Airtronics	World Class	Losi/Pro-Line	88/20
6	5	Todd Lewis	Losi	O	GM	Airtronics	Trinity	Losi/Pro-Line	84/19
7	6	Leon McIntosh	Associated	U	LRP	Futaba	Reedy	Pro-Line	—
8	9	Scott Haake	Losi	T	LRP	Airtronics	—	Pro-Line	—
9	2	Jarred Scott	Associated		LRP	Airtronics	Reedy	Pro-Line	87/20
10	4	Greg Degani	Kyosho		LRP	Airtronics	Orion	Pro-Line	—

access to it. I don't think the average racer wants to buy a new set of tires for every run, but that's what it takes to win."

To combat this inequity, Gil suggested the possibility of issuing a spec tire for next year's Winterchamps: "No one can have an advantage if they're all on the same rubber. We could mold a specific tire for the event and let the club control them. We could even mold 'Winterchamps 2001' into the sidewall. The racers would get a limited number of tires, which the club would distribute only for the race."

Make no mistake: Team Losi's passionate interest in keeping racing fair and accessible to all can only help. But what do you think? Are spec tires the answer? Would you be more likely to enter major events if such a program were in place? Email me at peterv@airage.com, and I'll print some of your comments in the next issue. ■

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- New rear bodymount GTP design
- Lowered rear up-rights
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NOVA MEGA

NovaMega: SX-15 MS EV3,
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SX-15 EV3
#2603, #2605

Bad Monkey Jr.

by Kevin Hetmanski

Most of the homebuilt project cars that have been featured in *RC Car Action*, no matter how highly modified, are usually based on some type of mass-produced, readily available RC vehicle. This is usually the best way to start a project, but it wasn't the path chosen by Mark Filipowicz, whose "Bad Monkey Jr." is the subject of this feature.

Mark decided to design and build an RC vehicle from scratch, drawing on his experience in full-size 4-wheeling. His truck started as an idea on January 4, 1999, and by January 2000, it was a reality.

Mark designed each of the more than 200 custom parts using state-of-the-art CAD (computer-aided design) software, and he manufactured them one at a time using many highly sophisticated commercial machines. The long list of details that went into the conception and realization of this project could fill volumes; we don't have nearly enough pages to give you the year-long play-by-play, but our Reader's Digest version still captures the key points of this most incredible project. Dig in!



The Bad Monkey has a very "busy" layout. This truck was 90-percent scratch-built, but it looks like a factory production kit, if you ask me.



SPECIFICATIONS

Length: 18 in.

Width: 14 1/4 in.

Wheelbase: 13 1/2 in.

Weight: 19.25 lb.

Design time: 300 hours

Machining time: 330 hours

Suspension travel: 2 in.

Motors: 2 Trinity 17-turn Sapphire

Radio: Futaba Magnum FP-3PJ PCM

Servos: 2 Futaba S9204

ESC: Tekin 420-G2

Battery: 6-cell Sanyo 4400mAh D-cell saddle pack

Total cost: approximately \$4,200 for materials, components, electronics and plating.

Total time to build: one year from inspiration to completion. Mark had the design and prints done in February and started to cut metal on February 20, 1999 (his 29th birthday). The design evolved, and Mark made some changes after the first test drive on September 14, 1999. The original design had a single steering servo.

The hours noted above don't include the time spent documenting the building process, almost in almost in real time on his website. Marks says, "I couldn't even guess how much time is in the website, which got a complete



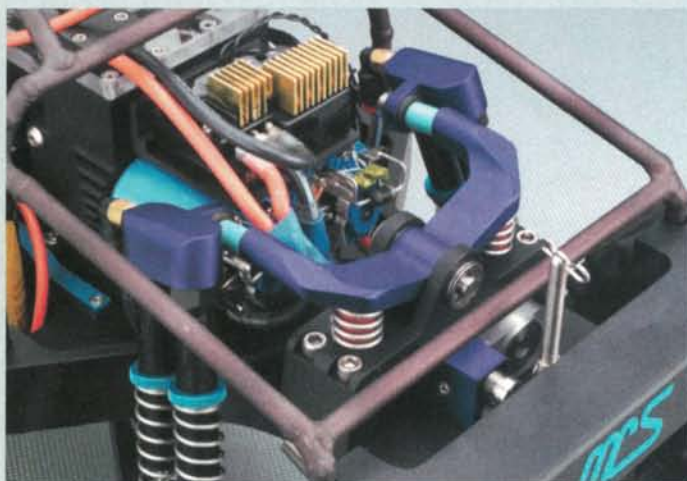
Mark's machined machine

Meet Mark Filipowicz, the Bad Monkey Jr.'s creator/builder—a true craftsman.

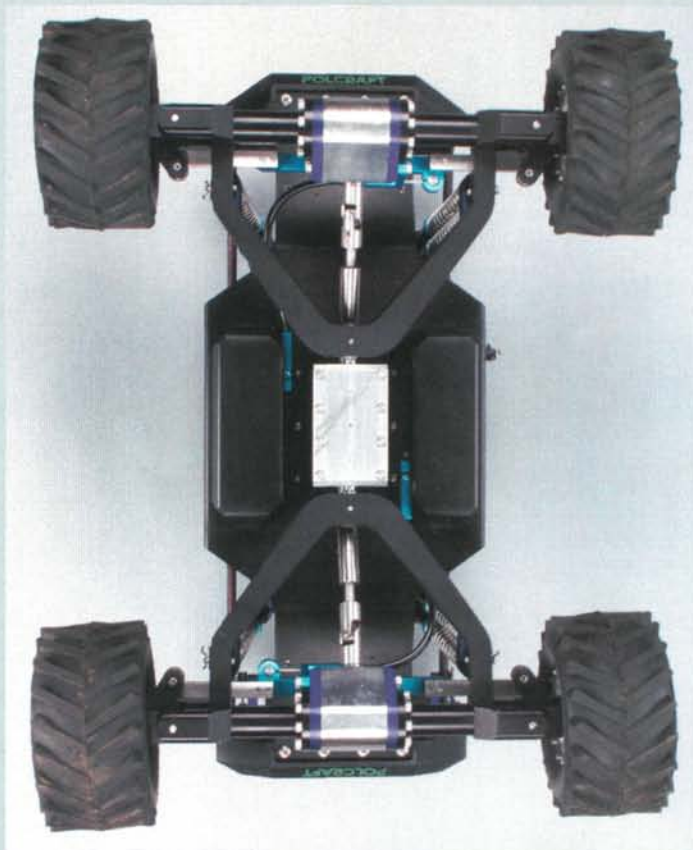
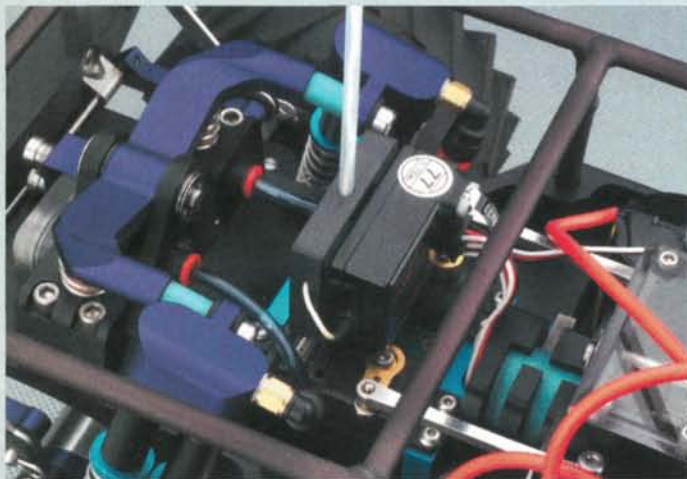
overhaul with a new format and tons of new content on January 24, 2000."

Most difficult step: "I wouldn't say anything was really difficult, but the most challenging part was by far the chassis. It took 24 solid machining hours to complete! That's a lot of time, considering I was doing it only on weekends. Because I am a machinist, my designs as an engineer are, by nature, easy to build. I would not draw something that I could not build myself."

Next project: "I'm torn between a 6-wheel Sojourner/Rover type vehicle and a puller! I could make a mean gearbox and drive train for a dedicated puller; it's a lot less work than the Rover, too."



Above: the floating shock mount has a ball-bearing pivot in the center. A spring and a silicone block on both sides of the pivot cushion the mount. You can see the adjustable one-way valve just behind the bumper. Below: how would you like to have a receiver mount as nice as this one? The servos have been neatly tucked underneath the receiver, and beefy rods connect the servos and the servo-savers.



Above: this masterpiece's underside looks very clean: see the steering cables protruding from the chassis? The telescoping drive shafts were machined out of titanium. Right: large (D-size) batteries provide the Bad Monkey with plenty of run time. Just behind the battery is the custom-made servo-saver.



CHASSIS

The chassis started life as a 25.5-pound chunk of aluminum. It took a little over 24 hours just to machine this one part. Pockets for the huge D-cell saddle pack were machined on each side, and hook-and-loop fastener straps are used to hold the batteries in place. A hole machined through the bottom of the chassis between the batteries allows the transmission to hang below the chassis where the drive shafts are connected. Both ends of the chassis have custom-machined, black-polycarbonate bumpers, and a roll cage constructed of solid aluminum rod ensures rollover protection.

DRIVE TRAIN

Two Trinity* Sapphire motors power the Bad Monkey Jr.; they are secured to a one-piece aluminum mount that's bolted to a custom-made transmission. To provide additional cooling, the mount has small fins machined into both sides.

The transmission housing is—surprise, surprise!—machined from a piece of solid aluminum, and inside it is a complete set of stainless-steel gears (about the only thing Mark didn't try to make on his own, other than the electronics). The gears ride on titanium shafts and seven, sealed, stainless-steel ball bearings. The transmission has a high gear (22.105:1) and a low gear (38.684:1) that can be shifted

when the truck is at rest. The transmission is capped with a piece of clear polycarbonate.

Universal joints are readily available at most industrial supply houses, but Mark decided to make his own out of three pieces of stainless steel. The universals are secured to custom-machined titanium drive shafts that were made to "telescope."

At the end of each drive shaft are very realistic custom-made axles. A polished, stainless-steel center section houses a ring-and-pinion gear that drives solid-titanium axle shafts. The axle tubes on either side of the center section were also machined from solid aluminum.

SUSPENSION

The truck's suspension design is unique: the axles are attached to horizontal, V-shaped suspension arms—one in the front and one in the rear. The "point" of each V-shaped arm is attached to the transmission housing just below the drive shafts with a large-diameter pivot ball. The arms' other ends are attached to both sides of the axles close to the wheels. This design allows the axles to move up and down and rotate without binding. The parts have been machined in such a way that the axles can't move from side to side. A rear swaybar keeps the truck sitting flat and can be quickly disconnected by removing the lower carriage pin.



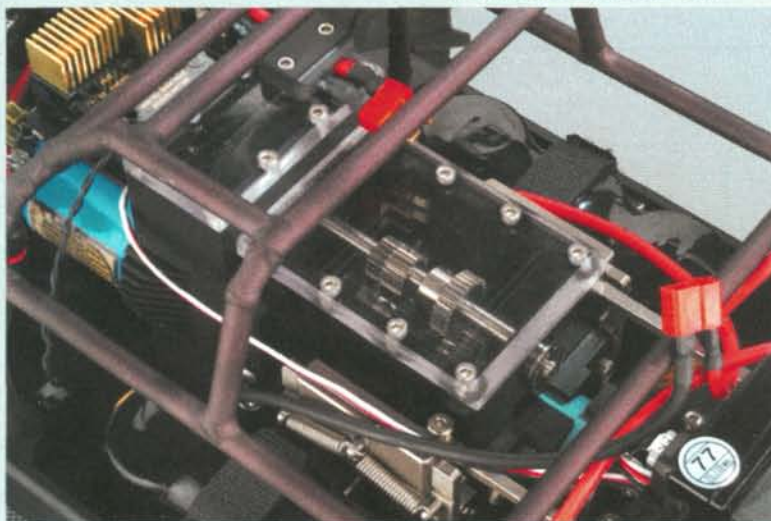
Above: don't even ask; you can't buy these rims anywhere. These are working, three-piece, bead-locking rims; to remove one tire, you have to remove 24 screws. Below: the motor mount/transmission housing; stainless-steel gears are secured to titanium shafts, and the gear assemblies rotate on sealed stainless-steel bearings. Clear covers make for easy gear inspection.



Even the swaybar looks good! It can quickly be disconnected by removing the lower carriage pin. The link can then be rotated and mounted on the frame and out of the way.



Two shocks at each wheel provide enough damping for this heavy truck; damping is adjusted by means of special, one-way valves.



These custom-machined axles look just like the real thing. The ends of the drive axles are keyed to the aluminum rims, and their center sections are made of stainless steel.

There are two shocks for each wheel. Each pair of shock bodies is threaded into a single top cap, so they're essentially one unit. The spring perches are also joined to create a "Siamese shock" effect. The shock bodies have been threaded so that the spring preload can be fine-tuned with a simple twist of the spring collars. The shocks' tops are joined to an articulated shock mount that's stabilized by two pieces of silicone rubber surrounded by a spring. A set of one-way valves allow Mark to adjust up- and down-travel damping independently. Oh, yes; with the exception of the springs, Mark made all the suspension components, including the shocks!

STEERING

Two Futaba*, S9204, high-torque, independently controlled servos turn the wheels. One servo controls the front wheels and the other controls the rears. It might not surprise you to learn that Mark also designed and machined his own servo-savers of stainless steel. The servo savers are designed to "give" only when the servos have reached a maximum torque of 131.9 oz.-in.

TIRES AND WHEELS

Mark didn't make the tires; he chose Pro-Line* Masher treads; however, he did make the machined-aluminum three-piece bead-locking

rims. The tires are held on with two rings and 24 screws, and he coated the rims with clear anodizing to keep them looking good all the time. Mark machined air holes through each wheels' center section between the spokes.

BODY

Mark tops his creation with a Dodge Ram body that Parma* custom-made especially for him; its bed has a tonneau cover. Mark machined a plug to fit the bed of the old body and sent it to Parma to be used in the molding process, and the company now offers the body—part no. 10388. Mark laid down the paint himself—not bad for a first-time airbrush job.

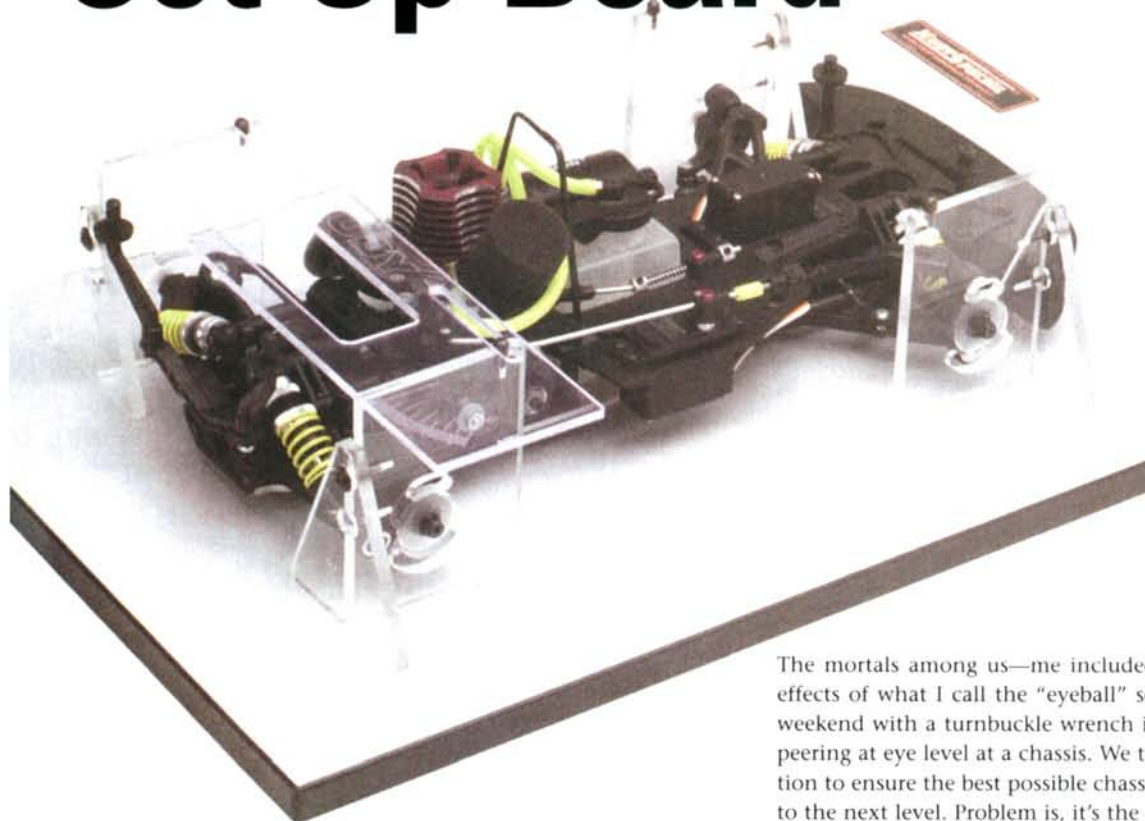
FINAL THOUGHTS

The Bad Monkey Jr. truck is definitely BAD! A lot of time and money went into building it, but it was time and money well spent. It's undoubtedly the most elaborate, most trick custom project to show up during *Car Action's* 15-year history. Though I've only "scratched the surface" in describing Mark's work, you can see the full story on his website: www.marksmark.net.

*Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

Hudy Set-Up Board

by Steve Pond



HUDY SET-UP BOARD

- Gauge block—part no. 10-7711; \$15.95.
- Setup board—10-8200; \$23.96.
- Support blocks—107701; \$23.95.
- Setup gauges (for select nitro and electric touring cars)—10-9000; \$91.61.

SETUP GAUGES FOR OTHER CARS

- Serpent, Neo and SMP Slide 1/8 on-road—10-8000.
- Serpent, Picco, Mugen and Neo 1/10 on-road (not 200mm touring)—10-8100.
- Picco 1/8 on-road—10-8300.
- Mugen 1/8 on-road—10-8400.
- Kyosho MP-6 1/8 off-road—10-8500.
- Crono, Laro and Bergonzoni 1/8 off-road—10-8600.
- BMT 1/8 rally game—10-8700.
- Mugen 1/8 off-road—10-8800.
- HPI electric 1/10 on-road (190mm)—10-9100.
- FG 1/8 on-road—10-9500.

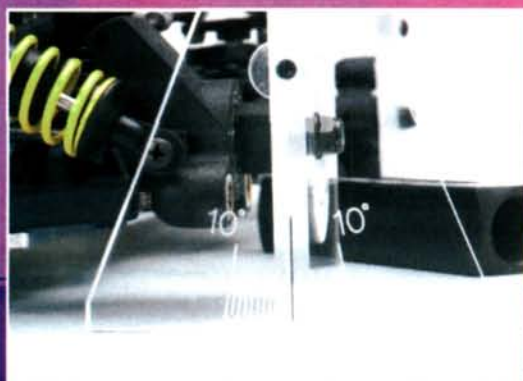
Prices range approximately from \$90 to \$110.

Proper chassis setup is one of the best-kept secrets of the most successful RC racing drivers; practice and plenty of natural driving skills are the cornerstones of much of their success, but chassis setup is a rarely visible part of the behind-the-scenes ritual that goes a long way to guarantee victory.

Usually behind the closed doors of hotel rooms at the conclusion of a day's racing, the world's best break out the camber gauges, calipers and tweak boards to "set up" their chassis for their next time on the grid.

The mortals among us—me included—often suffer the negative effects of what I call the "eyeball" setup method. On any given weekend with a turnbuckle wrench in our hand, we can be seen peering at eye level at a chassis. We take every reasonable precaution to ensure the best possible chassis setup, but we never take it to the next level. Problem is, it's the next level that makes all the difference. We try to drive around a bad setup, thinking the whole time that it's not the setup at all. Truth is, given the proper instruments to measure and the angles and dimensions that result from the "eyeball" method, it's painfully obvious that we can't trust our eyes as much as we hope.

How do we take setup to the next level? I discovered a well-kept secret that even many pro's have yet to find out about. Hudy Special Products*, which gained mainstream prominence in the U.S. with its premium-quality motor lathes, has introduced a new setup system for touring cars. Hudy is a prominent manufacturer in Europe and has worked closely with the best minds in 1/8 on-road racing for many years; the company now lends its considerable expertise to the touring-car market.



Left: the wheel plates are bolted on in place of the wheels; they allow quick and highly accurate camber-angle measurement.

Right: in the front or rear of the chassis, a toe-angle gauge straddles the wheel plates for instant, accurate toe-angle measurement.



FEATURES

- **Board.** The foundation of the Hudy system is the board, which features an exceptionally flat surface—critical to later measurements. Some racers use fragile glass or extremely heavy granite as the flat surface on which they make chassis measurements. The Hudy board features lightweight composite construction of what Hudy claims to be highly warp-resistant material. This provides the flat surface without the bulk and weight associated with other materials. The Hudy board also features a slick surface, which is also beneficial in the setup process—more on that later.

- **Spacers.** Chassis spacer blocks work with the setup board to precisely establish chassis tweak. A car with its wheels removed may be laid flat on the board, but a suspension hanging below the chassis, protruding screw heads, or anything else that would not allow the chassis to sit perfectly flat, would throw off the tweak measurements. These precision-machined spacer blocks can be placed under perfectly flat sections at the front and rear of the chassis to raise it off the setup board. Doing this ensures that the chassis is level when raised off the board so you can make precise measurements. The spacers are machined from duralumin and are hollow in the center to reduce the weight you'll have to carry around in your toolbox.

- **Gauge block.** The setup board's last element related to checking chassis tweak is a gauge block that's precisely machined from duralumin. A series of steps have been machined in the gauge block's top surface in 1mm increments, each with a corresponding number to indicate the height relative to the spacer blocks. The zero mark on the gauge block is the same height as the spacer blocks, and the numbers above or below zero indicate the height difference between the spacer blocks and whatever is being measured. When a chassis is propped up on the spacer blocks, the gauge measures the lowest point of the suspension. By comparing measurements from one side of the car to the other, the tweak can be established. If the measurement on the left rear suspension is plus 2mm, for example, and the right rear measures plus 1mm, then the rear suspension is tweaked by 1mm. This can be corrected by shortening the right rear shock by 1mm (you must also remember to reduce spring preload on this shock by 1mm, but that's the topic of another article).

- **Camber gauge.** This is the trickiest and most effective part of the Hudy system. It looks rather intimidating and complicated at first glance, but it's as quick and simple to use as bolting on a new set of wheels. The camber gauges are mounted directly to the car, and they precisely measure all the suspension angles with far greater accuracy than any other system I've ever used. What I'll call "wheel plates" are mounted in place of the actual wheels, and triangular gauges are mounted on the wheel plates at a 90-degree angle. This

is where a picture is worth a thousand words: just take a look, and it should be clearer than I could ever explain! The triangular gauges allow you to quickly measure the camber angles at all corners of the suspension. The bottom edges of the wheel plates are rounded to prevent the plates from loading the suspension and fudging the readings, and the Plexiglas gauges slide freely on the setup board, so there's none of the surface tension commonly found when using setup wheels with O-rings or the tires themselves. If the setup device isn't allowed to move freely to settle the suspension, the readings will be inaccurate. If you've ever seen an alignment rack for a full-size car, you may have noticed that each wheel sits on a plate that moves freely in any direction. The Hudy system basically allows the same movement that in turn allows the suspension to settle properly for the most accurate measurements. It's somewhat difficult to explain, but trust me when I say you'll never get a more accurate camber measurement.

- **Toe-angle gauge.** The last and most important link in the Hudy system is a toe-angle gauge. It straddles the wheel plates to help you accurately measure front and rear toe angle in less than a minute. Stops installed in the top of the wheel plates fit into slots in the toe gauge. Toe angle is measured simply by sliding the toe gauge from one side to the other. Indicators on the plates point to a scale engraved in the toe-angle gauge and, voilà, you have the toe angle!

FINAL THOUGHTS

The Hudy setup system represents the ultimate in precision for serious racers. It looks a little intimidating, but it's very simple to use. Yes, it's larger and more unwieldy than a simple camber gauge or a bubble-type tweak board, but I think its advantages outweigh any inconvenience in transporting it to the track. Despite its sophistication, the Hudy system can't account for weight distribution, which some might suggest is a weak point, but I feel it's one of this system's strong points. This is the only system that can isolate chassis and suspension tweak from uneven weight distribution, and that means you won't be fooled into thinking the chassis is tweaked when, in fact, it's suffering from uneven weight distribution.

The Hudy system reaches much deeper into your wallet than any other tool, but it's available as components as well as a complete system, so you can pick and choose the elements you consider most important. It is not for those of you who aren't serious racers, though. Unless you have the skills and the need to exploit an immaculate chassis setup, you won't see any benefit to owning a Hudy setup system. However, if you pass the acid test as a serious racer with the means to buy such a system, it could give you the extra edge that might mean the difference between first place and first loser.

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■*



Left: the wheel plates are slotted in the appropriate places to allow the pivot-ball suspension to be adjusted without your having to remove anything from the car.

Right: spacers and a gauge block measure suspension droop, so they effectively determine tweak without being affected by uneven weight distribution.



The Great Pipe Dream

I get a lot of email that reads something like this: "Chris, I've heard you say the motor creates a semi-vacuum to draw fuel into the carburetor. That is only part of how the fuel gets into the engine. The most important way that fuel gets in is by the pressure of the exhaust. The line that goes from the pipe to the fuel tank pressurizes the tank and forces fuel to the engine. If this line is kinked or off, the engine will not run correctly or may not run at all."

Oh really?! Well think about this my friends: here I have "exhibits" A and B—two pictures of engines from the days before mufflers even existed! These are 2-stroke glow-plug engines that run on a methanol/nitro/oil mix just like today's engines. While porting techniques are different on today's engines, the process by which they draw fuel into the carburetor is identical to that of the engines from the '70s shown here. The fuel is sucked into the carb with negative crankcase pressure; in essence, the engine



If you guys continue to focus on muffler pressure, which does help to maintain a more constant needle setting as the tank empties—at the expense of focusing on a rich needle-valve setting to protect your engine—you'll continue to burn out engines ...

sucks. The point is, these engines never had mufflers—hence, no muffler pressure—and ran just fine. The exhaust baffles are needed to keep combustion temperatures up during idle. An engine running with an open exhaust will not have a reliable idle. Besides quieting our engines and boosting performance, the tuned systems of today also keep combustion temps up during idle. Further testimony that muffler pressure is *not* the means by which the fuel gets to the carb is offered by our illustrious executive editor, Peter Vieira. A few months ago, in the first 5 minutes of the A-main of an off-road 1/8-scale race, Peter's header/muffler coupler bailed out. He finished the remaining 15 minutes; how did fuel get to Pete's carb for 15 minutes? I guess it's safe to say the disconnected muffler with its pressure-tap line had nothing to do with it! This also proves another point: Peter knows how to set a needle valve. If he had his needle set to the maximum lean position—something you should

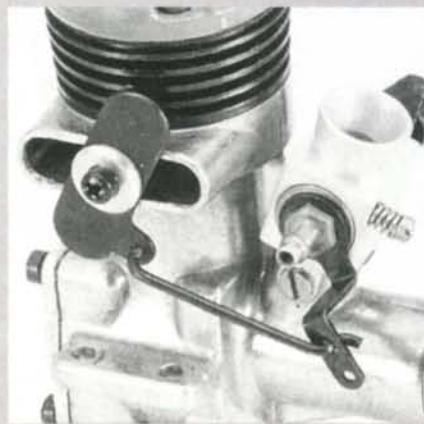
ILLUSTRATION BY DAVID BAKER

From the deafening days of open exhaust ...

Shown here is a rotary-type exhaust baffle used on K&B engines. Since the rotary baffle mechanism was located entirely within the exhaust stack, very early mufflers could be designed so they could be used without interfering with rotary baffle operation. This, of course, was before it was totally realized that a muffler, while quieting the engine, would also keep combustion-chamber temperatures up at idle—the sole job that baffles were designed to do. Removing this type of exhaust baffle for muffler placement presented a problem because two gaping holes were left in the exhaust-stack sides where the baffle once was. A few interesting "fixes" were offered, but none worked very well because they were too complex. Eventually, K&B did away with the exhaust baffle—as did every other manufacturer—and redesigned the exhaust stack with no holes.



The "butterfly" type was the most commonly used exhaust-baffling system. Shown here on a McCoy engine, in the '70s, this was the method chosen by O.S. for its engines. One reason for its greater popularity and longer use by many manufacturers than the rotary-type baffle is because it's external and is easy to remove—unscrew one screw. Moreover, no open holes were left in the exhaust stack when the baffle was removed. This meant that in the early days when mufflers were becoming more and more available, the modeler could opt for a baffle or muffler operation with no problem.



Which cools most: fuel or airflow?

Q Chris, since you're the piston-power guy, this question is for you. I have an RC10GT with a .12 CV engine that I drive in the street, which has no traffic, so I drive and drive without a worry of hitting another car. Is it safe for the engine to be wide open going up and down the street? The street is pretty long, and it should be OK for these extended periods as long as it's being cooled by air—right? [email] Kevin

A It will be safe as long as it's being cooled by being run with a rich mixture. True; our engines are cooled by proper airflow, but more cooling is accomplished by carrying heat out through the exhaust. Oil and unburned alcohol extract a great deal of heat from inside an engine. It's this cooling rich mixture that will protect those all-important piston and sleeve surfaces. Keep the mixture rich, Kevin, and you'll be OK. CC

never do—his engine would, in fact, have quit. Peter wisely backed off a few 100rpm from the leanest, highest rpm setting so the engine would be running slightly richer for cooler, better lubricated running. The point here is that, yes, muffler pressure does help a bit by sup-

plying positive tank pressure. If the pressure tap comes loose and the positive tank pressure suddenly goes away, this will further lean your setting, and the engine will quit if it has been set too lean in the first place. Also, if the pressure-tap line gets kinked, your engine will shut off

not because this line is responsible for the fuel flow but because, in essence, the tank vent is now blocked off, and a negative tank pressure builds up as fuel is sucked out of the tank; this makes it harder and harder for the engine to suck fuel out of the tank.

I know I've been a bit sarcastic here, but you guys have to see the big picture, which is recognizing why your engine is—or is *not*—getting sufficient fuel flow. This subject is so important to the continued success and enjoyment of nitro power. It's the all-important piston/sleeve seal that creates the vitally needed negative crankcase pressure that sucks fuel into the engine. At all times, this piston/sleeve seal must be protected with a rich setting that cools and lubricates these two components. If you guys continue to focus on muffler pressure, which does help to maintain a more constant needle

setting as the tank empties—at the expense of focusing on a rich needle-valve setting to protect your engine—you'll continue to burn out engines and blame everything under the sun except the self-appointed "expert" know-it-all who erroneously told you that muffler pressure is mainly responsible for proper fuel flow in the first place. The only thing that these guys prove is that a little knowledge can be dangerous and very costly; consider the price of a new piston and sleeve.

Since we're on the subject of fuel flow, now would be a good time to tell you guys what I have planned for the next "Piston Power." It will be all about a fuel-pump system that will be commercially available by the time my next column hits the stands. That's right: a fuel-pump system just like the ones on full-scale cars. It's about time. Our RC car engines deserve some fuel-flow assistance! ■

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How to prepare and paint ABS plastic bodies, Part 2

In the May installment of "4x4," I showed you how to prepare an ABS plastic body for painting. This month, I give you some tips on laying down paint and detailing a body, and I show you how to use a polishing kit to get the perfect finish out of your paint.

COLOR SELECTION

Of course, you have to choose a color before you paint anything. For a project like this, I recommend Testor's* spray and bottled paints, which are easy to find at hobby shops and some toy stores and come in a wide range of colors.

Keep in mind that different types of paint must be applied in different ways.

Apply solid colors straight to the primed surface; candy and pearl colors are a little different: with these, you apply a base color first because they are somewhat transparent. You can change the look of a candy or pearl by using a different color as your base color. For example: pearl white requires

a white base, but you can change its look by using a red base. Candy Apple Red can benefit from a gold or silver base. Why would you choose these colors? What effects do they give? Gold plus Candy Apple Red gives an orange-ish hue, while silver will leave it more red. Just remember that any color you choose for your base will show through pearl and candy colors, so before you experiment on your body shell, you might want to test your base-coat/top-color combo on a separate piece of plastic to see what the result will be.

PAINTING

Before spray painting, place the can in warm water for a while to increase the pressure inside the can and help the paint to flow better. Shake the can for a minute or so to mix the paint thoroughly. I start at the top of a body and

work my way downward, spraying lightly from side to side. Apply light coats, and allow time for the paint to dry between coats; half an hour should be enough. For the ultimate finish, allow each coat of paint to dry for at least a week, then carefully wet-sand the surface with fine sandpaper, wash with soap and water, and dry the body thoroughly before you apply another coat of paint.

Apply paint only until you have an even coverage over the entire body; then apply one more coat, using just enough paint to give the body a wet look without allowing it to run or fill the details that have been molded into the body. This should give you the shine you're looking for.

While painting a body, you may see a small drip or a small piece of debris in the finish. Don't worry about it; we will take care of that later. If you get a huge paint run,

you can wipe it off with your finger while it's still wet and touch up the area with another coat or two of paint, but if you aren't careful, you may make matters worse. Keep in mind that you can always sand the body and start over. That's no picnic, but at least you won't have to toss the body as would be the case with a Lexan shell.

SHOW-WINNING SHINE

No matter how careful you are, you probably won't be able to get a perfect finish straight out of a can. You may have a piece of dust, a paint run, or an "orange-peel" finish. You can fix these and achieve a brilliant gloss by using the fine-grit sandpapers and special polish you'll find at automotive paint stores. LMG Enterprises Inc.* offers a polishing kit that includes all the equipment you need to polish your body shell;



This is the LMG Enterprises polishing kit I used. Use it properly, and you'll achieve that show-winning shine you've been looking for.

I'm using this kit in the photographs shown here.

Let the paint dry for at least a week in a warm, dry area. The harder the paint is, the better the eventual finish will be. If you have a rough finish, start with a coarse (1800-grit sandpaper; if it's fairly smooth, start with a mid-range (3600-grit) sandpaper.



Above: the finished body has been mounted on the Clod Buster chassis—glossy! Painting and detailing is not that hard; it just takes time and patience. Left: I painted my Tamiya Juggernaut2 using the techniques described here—looking good, eh? Look for a "Track Test" on this truck in the next issue of Car Action.





Above: a fender in the early stages of being polished. Notice that it has a uniformly flat finish. This tells you that you have removed all of the "orange peel" and dust from the paint. **Below:** the fender has been polished. Polishing a body takes time, but as you can see, it's well worth the effort.



1. Having chosen a sandpaper, lightly wet-sand the body, but stay away from the body's sharp edges, or you may accidentally rub through the paint. To sand large, flat areas, I use a small foam or rubber sanding block; in tight areas, I just use my hand.

2. Wet-sand in a straight line—never in a swirling motion—and change the direction of sanding when you change to a finer sandpaper. Sand the body from front to back, then change directions and sand from top to bottom, and so on. Sand only a small area at a time, and wipe away the water periodically to check your progress.

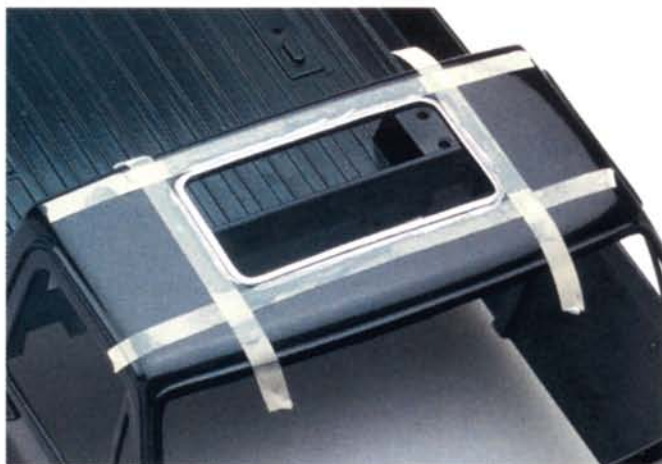
3. Sand the body until the paint's entire surface has a uniformly flat finish, then change to the next finer sandpaper in the kit. Sand in alternate directions until you have a uniform finish. Eventually, you will work your way from the coarsest sandpaper to the finest. I wash a body when I change grits to ensure that I have a clean surface.

4. The finish should be looking good now, but it gets better. With a soft cloth, apply the polishing compound, using the same straight motion as you used when sanding. Wash the body once more, then apply a coat of wax. If you do not using the LMG kit, try Model Wax by Treatment Products*. It will give your body a mirror shine.

DETAILING

Now that you have such a shine that you have to wear sunglasses to look at it, you may want to add details to make the body look a little more like the real thing. This Clod Buster body has small details everywhere: turn-signal lights, brake lights, trim around the windows and grill details.

1. Wash the body with soap and water to remove any wax, polish and fingerprints. (Yes, you have to wash the body again; keeping it clean is half of a good finish!) This will allow masking and paint to stick well. The detailing will have to be done in stages. Detail one section, and when it's dry, move on to another.



There are many ways to paint body details. Here, I use masking tape and a brush. Instead of trying to bend the tape around the corner and wondering whether the paint will bleed through, I carefully hand-painted the corners of this opening.

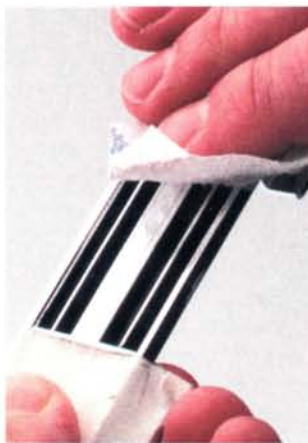
2. I suggest you use water-based paint for body details. If you make a mistake, it can easily be removed with water and a cloth before it has had a chance to dry.

3. There are a couple of ways to paint these details. You can use liquid mask, but be careful when cutting out the mask. Use only just enough pressure to cut through the mask—not through the paint or into the body. Masking tape would be the next choice. Try this when painting the details: use Pactra* Racing Finish tape to mask a detail outline; it's very flexible and adheres very well. Once the tape has been laid down, cover it with regular masking tape. This may take twice as long, but the results are well worth the time.

4. When an area has been masked off, you can paint with a spray can or a paintbrush. If you are really confident of your ability, you can omit the masking and paint all of the details by hand with a fine brush.

5. Painting the grill can be a long, tedious job, but it doesn't have to be. Mask off the grill area so that you don't get paint on any of the other details. Using a large brush, apply water-based paint over the entire grill, working the paint into all of the small grooves. Before the paint has time to dry, wipe off the high spots using a damp rag.

6. To spice things up a bit, you can also add windshield wipers and side-view mirrors. Tamiya* and Kyosho* use these kinds of detail on their sedan bodies. These pieces have to be glued to the body. Don't use CA for this; certain glues tend to fog the finish on injection-molded parts. Use Testor's liquid cement, but remember to first remove any paint or plating where you plan to glue parts to the body. This will allow the glue to properly bond the plastic pieces together. You may also use a small dab of silicone or Shoe-Goo.



Here's an easy way to detail a chrome grill: tape the headlights, then slosh water-based black paint into the grill's grooves. Before the paint dries, wipe over the grill's high spots with a wet paper towel.

So now you have that beautiful RC truck body you have always wanted. You probably won't want to bash around with your "show" body, but it will turn a lot of heads. Making a body look this good is not hard to do; it is just time-consuming. Take your time, and I'm sure you'll be pleased with the results.

SHOP TALK

I have a Losi Double-XT 'CR.' I mounted Pro-Line Masher tires on it, and it seems slower. What can I do to make it fast again?

DONNA GAJEWSKI
Baltimore, MD

Your truck seems slower because the larger tires give the truck's drive train a higher gear ratio. The truck will have a higher top speed with the larger tires, but its acceleration will suffer. The Mashers have a circumference of 14.719 inches, while the step-pin tires your Double-XT came with are about 12.560 inches in circumference—a difference of 2.159. You need to gear lower to compensate for that. Install a pinion that has three fewer teeth than what you have now, and your truck should run more like its old self.

If you have any problems or questions about trucks, or if there is something you would like to see in "4x4," email me at kevinh@airage.com or send your letters to:

"4x4"

RC Car Action

100 East Ridge

Ridgefield, CT 06877-4606 USA



RPM gear cover and ESC mount for the Traxxas Stampede

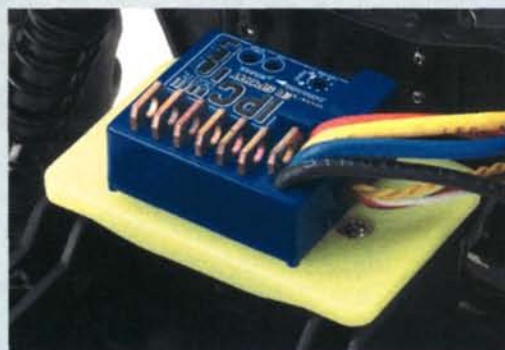
This RPM® gear cover is designed to be an aftermarket direct replacement for the Traxxas Stampede's. It completely seals the pinion and spur to keep out all dust and dirt, but its unusually large access hole allows easier slipper-clutch adjustment. There is also more clearance inside for larger pinion gears. The gear cover is offered in



black (part no. 80402), neon blue (80405) and neon yellow (80407).

Among most Stampede truck owners' first upgrades is an ESC, but there is really no good place to mount it.

RPM has solved that problem with this simple ESC mount. The mount covers the hole where the mechanical speed control was and gives you a large flat surface on which to mount your ESC. Just like the gear cover, this mount is offered in black (80362), neon blue (80365) and neon yellow (80367).



*Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

HobbyTown USA®

Where Hobbies Begin!™

Tekin G-12c III Electronic Speed Control



HTU Price
\$109.99
Reg. \$199⁹⁹
TEK1121

Availability and Participation May Vary. See Store for Details.
Not Valid With Other Discounts, Coupons, Offers, or "Our Price"
Some Items. Coupon Must Be Presented To Receive Discount.
Limit One Coupon Per Person. Expires 7/9/06.

Nitro Power 7.2V 1400mAh Battery Pack



HTU Price
\$12.99
Reg. \$25⁹⁹
NTPR72

Availability and Participation May Vary. See Store for Details.
Not Valid With Other Discounts, Coupons, Offers, or "Our Price"
Some Items. Coupon Must Be Presented To Receive Discount.
Limit One Coupon Per Person. Expires 7/9/06.

Futaba 3PJFS 3-Channel Radio



HTU Price
\$279.99
Reg. \$399⁹⁹
FUT3PJFS

Availability and Participation May Vary. See Store for Details.
Not Valid With Other Discounts, Coupons, Offers, or "Our Price"
Some Items. Coupon Must Be Presented To Receive Discount.
Limit One Coupon Per Person. Expires 7/9/06.

Auburn, AL (334) 826-8216	Merrillville, IN (219) 736-0255	Cincinnati, OH (513) 697-8224
Mobile, AL (334) 633-8446	Lawrence, KS (785) 865-0883	Columbus, OH (614) 777-9307
Gilbert, AZ (602) 892-0405	Overland Pk, KS (913) 649-7979	Mentor, OH (440) 946-5588
Phoenix, AZ (602) 598-5282	Wichita, KS (316) 683-7222	Southpoint, OH (740) 894-6303
Tucson, AZ (520) 882-8888	Lexington, KY (606) 277-5664	Strongsville, OH (440) 846-1770
Fayetteville, AR (501) 571-3730	Louisville, KY (502) 254-5755	Norman, OK (405) 292-5850
Little Rock, AR (501) 223-5155	Owensboro, KY (502) 688-9050	Clackamas, OR (503) 652-5899
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Chino, CA (909) 591-9958	Easton, MD (410) 820-9308	Charleston, SC (803) 769-5808
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San Marcos, CA (760) 739-0672	Ann Arbor, MI (734) 996-2444	Sioux Falls, SD (605) 339-6613
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Co. Springs, CO (719) 637-0404	Traverse City, MI (616) 929-5615	Franklin, TN (615) 771-7441
Fort Collins, CO (970) 226-3900	Columbia, MO (573) 446-7418	Germantown, TN (615) 757-8774
Longmont, CO (303) 774-1557	Kansas City, MO (816) 459-9590	Knoxville, TN (423) 690-1099
Westminster, CO (303) 431-0882	St. Louis, MO (636) 394-0177	Nashville, TN (615) 851-2400
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Brandon, FL (813) 655-6366	Minnetonka, MN (612) 470-7474	Austin, TX-South (512) 440-7877
Miami, FL (305) 273-7803	Jackson, MS (601) 957-9900	Austin, TX-North (512) 246-8904
Ormond Bch., FL (904) 672-5441	Tupelo, MS (662) 690-6030	Flower Mound, TX (817) 263-1196
Tallahassee, FL (850) 671-2030	Boone, NC (828) 265-3367	Fort Worth, TX (817) 758-7875
Augusta, GA (706) 855-5003	Charlotte, NC (704) 544-2303	Plano, TX (972) 758-8697
Columbus, GA (706) 660-1793	Raleigh, NC (919) 790-5324	San Antonio, TX (210) 829-8697
Kennesaw, GA (770) 426-8800	Wilmington, NC (910) 256-0902	Taylorville, UT (801) 964-8242
Macon, GA (912) 474-0061	Winston-Sal., NC (336) 774-2324	Virginia Beach, VA (757) 464-4140
Statesboro, GA (912) 489-8700	Grand Forks, ND (701) 746-0708	Lynnwood, WA (425) 774-0819
Ames, IA (515) 232-9060	Grand Island, NE (308) 382-3451	Redmond, WA (425) 558-0312
Cedar Rapids, IA (319) 364-3289	La Vista, NE (402) 597-1888	Tukwila, WA (206) 575-0949
Council Bluffs, IA (319) 355-2071	Lincoln, NE (402) 434-5056	Brookfield, WI (414) 782-4332
Davenport, IA (319) 376-1942	Norfolk, NE (402) 371-2240	Delafield, WI (262) 646-5755
Boise, ID (208) 376-1942	Omaha, NE (402) 498-8888	Green Bay, WI (920) 490-9996
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FMA Direct SuperNova 250S

"Will it charge NiMH cells?" You can't get away from that question when checking out chargers. FMA Direct's* new SuperNova 250S proudly proclaims "for NiMH battery" on its case, and that doesn't just mean transmitter and receiver packs.



FMA's newest charger is designed to take on the Novak Millennium, Tekin BC112A and other full-featured DC "pro" chargers and offers a solid mix of features to go with that all-important NiMH compatibility. It's priced competitively, too, and should be on your "check-out" list if you're shopping for a race-ready charger. I tried one and had good luck with it (see for yourself).

FEATURES

- **LCD display.** The SuperNova's dot-matrix screen is much more flexible than an 8-segment calculator-style display and shows all the functions and parameters you need to scroll through, along with charge/discharge data while the SuperNova does its thing.
- **NiMH compatibility.** The SuperNova's manual

does not indicate what voltage drop it is programmed to detect in NiMH mode, but, hey, at least it has a NiMH mode. There's also a Ni-Cd mode (of course) and even a lead-acid setting.

- **Auto charge mode: push-start, charge pack.** This mode lets you skip programming the SuperNova with your pack's capacity, number of cells, etc. In Auto mode, the Nova will "automatically analyze and select the optimum charge or discharge current for any 1- to 25-cell Ni-Cd battery pack." The manual goes on to say that the SuperNova will monitor the pack once per minute and adjust the amp rate for maximum efficiency while in Auto mode.

- **Adjustable charge/discharge amperage.** You can dial in the 'Nova to charge at 0.1 to 5 amps and discharge from 0.5 to 3 amps (with a nonadjustable cutoff of 0.9 volts per cell).

- **Low-/high-input voltage warning.** If your DC power supply has insufficient juice to operate the SuperNova, it will sound an alarm. Likewise, if you pump too much power in, the 'Nova will

MANUFACTURER'S SPECIFICATIONS

Input.....	10 to 13V DC
Charge current.....	0.10 to 5 amps
Discharge current.....	0.5 to 3 amps
Discharge cutoff.....	0.9V per cell
Cell capacity.....	1 to 25
Cell type.....	Ni-Cd, NiMH, or lead-acid
Display.....	2x16-character dot-matrix
Weight.....	1.25 lb.
Dimensions.....	5.7x3.62x1.6 in.



These screens are used to program battery capacity, switch the unit's "beeper" on and off and set the charge amperage; there are other screens for the charger's other functions. The bottom screen shows what you see as the SuperNova charges a pack: charge time, capacity, charge mode and pack voltage.

protest before something goes "poof."

- **Reverse polarity protection.** If you connect the SuperNova to its power supply in reverse, or connect the pack to be charged in reverse, the 'Nova will not be damaged. If the pack is connected backward, the charger's display will warn you.

- **Built-in discharger.** The discharging function is programmed with cell number, capacity, etc., just like the charge mode. It's not a high-amperage discharger, however, (just 3 amps max). The SuperNova cuts off the discharger when the cell voltage drops to 0.9 volts.

- **Charge "preset" memory.** Punching in the number of cells, battery capacity, amp rate, etc., each time you use the SuperNova would be a hassle, so the software engineers designed the "preset" feature, which allows you to store your settings. The charger is pre-programmed to accommodate common cell configurations, but you can overwrite the factory settings to suit your needs.

Continued on page 188

Associated

Factory Team TC3 Motor Clamp and Cam

These upgrade parts are machined of aluminum to the exact specs of the original pieces and don't require any chassis modifications. In addition to being direct replacements, they're light and anodized a bright blue that will match the hardware on any TC3 Team touring-car kit. The clamp and cam are sold separately.

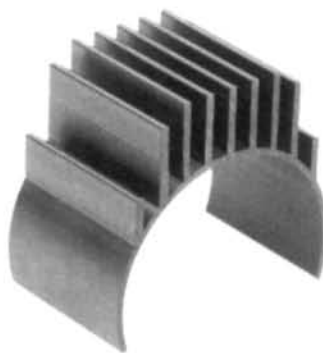
Part nos.—
3933
(clamp);
3932 (cam).
Price—\$35;
\$25.



Tamiya

Aluminum Motor Heat Sink

Tamiya's new TB-01 kit comes with an effective heat sink to dissipate heat from the motor under the enclosed body shell. The heat sink is now available separately for use with other cars. It's 1-inch long with tall cooling fins and is anodized in blue. The lightweight unit clips on over the motor and fits in most cars, except for Tamiya models TA03, M03 and FF02. Part no.—53399. Price—\$9.29.



Continued from page 186

- **Sound on/off.** The SuperNova beeps with each key press, and the "charge complete" alarm's volume rivals most alarm clocks. That's great in the pits; not so great at 2 a.m. (we've all wrenched that late, right?). Thankfully, the Nova can go beepless with the push of a button.
- **Charging stand.** Snap-in legs hold the SuperNova at the perfect angle for easy viewing.

OPERATION

Three keys program and operate the charger; basically, you scroll through menus from left to right with the Down-Up keys and make selections with the Set key. The LCD screen is difficult to understand at first, but once you've read the instructions, it all makes sense. In Auto mode, all you have to do is hit Start. For manual mode, you scroll through screens to set the battery type (Ni-Cd, NiMH, or lead-acid), capacity (500 to 5000mAh), number of cells (1 to 25), charge amperage (0.1 to 5 amps) and discharge amperage (0.5 to 3 amps). When all the data has been entered, scroll over to Start, and you're charging. As the SuperNova pumps in the amps, the dot-matrix screen shows the capacity of the pack in milliamp hours as it "fills," charge time in minutes and seconds, pack voltage, charge amperage and the percentage of fully charged the SuperNova estimates the pack has reached.

After assembling a set of output leads (none are included), I was ready to charge my packs. I tried the Auto mode first, which typically

Likes

- Compact and sturdy.
- Includes cooling fan and charger stand.
- Easy to use.

Dislikes

- Voltage threshold is not indicated and is nonadjustable.
- Output leads are not included.

begins a charge at less than 1 amp then quickly ramps up to the 4- to 5-amp range. Manual mode simply provides a linear charge at the amperage you set it for. Both modes worked flawlessly, and the SuperNova never failed to shut down after peak-charging the pack to slightly above room temperature. I tested the charger with 1500 and 2000mAh Ni-Cd packs and 3000 NiMH packs—all with good results. I would like the option of changing the voltage threshold, but the factory settings seem to work well (according to FMA, the NiMH mode "looks for" a 3- to 5-millivolt drop, and the Ni-Cd mode is set for 9 millivolts). The unit's built-in cooling fan proved effective and kept the charger's aluminum heat-sink case to a warm but handleable temperature.

I dumped the charged packs using the SuperNova's built-in discharger, which tops out at 3 amps. This isn't a very useful amp rate for pulling down a fully charged pack or cycling (20 amps or more is best for Ni-Cd packs), but it is good for draining a pack after a run, before dropping it into a discharge tray. The Nova shuts down when the pack voltage drops to 0.9 volt per cell—a safe number for all types of packs. The same setting procedures and display functions for charging are used to discharge.

SHOULD YOU BUY ONE?

If you're looking for a DC "pro" charger, the SuperNova could be for you. It seems solidly constructed, works very well, and it's easy to use. Unfortunately, the SuperNova does not enjoy a price advantage over the similarly equipped Novak Millennium or the Tekin BC112C, but it is definitely worth a look when you narrow your high-end charging purchasing decision.

—Peter Vieira

Part no.—FC700; price—\$139.

Trinity

R-Minus Gold Battery Connectors

These "Coral-style" gold-plated connectors offer the convenience of low-loss, solder-free connections without the extra wire required by plugs. The male pieces are for the ESC wires and fit up to 12AWG wire, and the female connectors are for the battery.

We found that these connectors make excellent contact and are almost impossible to disengage in a crash. Best of all, you only have to solder them once. Part no.—RC5021 (2 male and 2 female, to equip one ESC and one battery); RC5021B (2 male and 20 female, to equip one ESC and 10 packs). Price—\$2.99; \$14.99.



Finish Line/Hobbico Speed Wash

This bright pink car cleaner is a great way to remove fuel and oil residues as well as dirt and dust from your vehicle. Just spray it on, brush the area gently and wipe it off. The cleaner's ingredients help prevent rust and oxidation, and it has a nice watermelon-like scent. We found it very useful when cleaning dirt and oil from cars after testing, or to remove adhesive and marker from bodies. Part no.—H00320101. Price—\$6.99.

Robinson Racing Products

HPI RS4 Nitro Brake System

Robinson's new brake system for the RS4 is an excellent upgrade for those looking to improve their stopping power. The new system replaces the stock plastic hub with an aluminum hub to which the hardened aluminum brake disc is bolted. The disc is cross-drilled to help keep it cool and maintain braking consistency. Two types of pads are included to increase or decrease the aggressiveness of the brake action. We installed the system in a Racer kit and brake action was very consistent, without the pulsing brake action common to the stock, untrued fiber disc.

Part no.—1575.

Price—\$28.99.



Trinity BK Pitch Gears

Off-road cars use 48 pitch; on-road cars use 64 pitch. As long as I've been in the hobby, that has been the rule and, frankly, everything always worked out just fine. Then Trinity* came along with BK pitch and shook everything up. BK pitch is actually 56 pitch, which is coarser than 64 pitch but finer than 48. I've been testing the gears since I reviewed the Team Losi Triple-XT (May 2000 issue); here's what I discovered.

FEATURES

- **Vehicle fit.** BK spur gears are offered in two types: a "standard" hole pattern for ball-diff-equipped direct-drive cars and all transmissions that use Associated-style "two-hole" mounting, and a keyed, solid gear for all Losi vehicles.
- **Available gears.** The Losi spurs are offered in 92-, 96-, 98- and 100-tooth sizes; the "standard" gears are available with 96, 98 and 100 teeth (this just in: Trinity now also offers an 84-tooth gear in response to requests from Associated TC3 owners).
- **Construction.** BK spur gears begin life as molded graphite-composite blanks, then are sent through a CNC machine to have the teeth cut. Some guys argue that molded teeth are better, but I believe it is more precise to machine the teeth rather than count on a completely molded gear to shrink precisely. The BK pinions are made of the same material as the Trinity "Hard Ones" gears; they're machined of 6061 aluminum and then hard anodized for maximum wear and efficiency. The pinions feature 4/40 setscrews, which are less prone to stripping and loosening.

IN ACTION

In addition to my own testing, I passed out some sample gears to the crew from Big Boys' Toys when we did the Losi Triple-XT test. They all came back with the same types of comments and felt the gears made the car feel a little punchier. Maybe the effect was just psychological (I always feel faster with new stuff on my car, don't you?), but I got the same type of feedback from Trinity's team drivers. Feeling fast is being fast, so if the guys like the BK gears better, I'll chalk it up as a plus.

If you're worried about the durability of the BK gears' finer teeth (compared to 48 pitch), don't be; I haven't had a problem nor heard a report of any problems from guys running the new gears. The only problem I did encounter involved the smaller diameter of the gears (compared to 48P gears with similar tooth counts). For example, I wanted to go up a tooth on my Triple-XT for my Main but didn't have the gear I wanted (it's the age-old story: loaned it out, didn't get it back). Instead, I went



I ran an entire Main like this! The BK gears are tough.

down a tooth on the pinion and down four teeth on the spur. Unfortunately, the slots in the Triple-XT's motor plate did not allow the gears to mesh fully; the pinion's teeth just barely reached the spur gear. I had no time to try another ratio, so I just buttoned up the rear end and hit the track, hoping the gears would hold out. They did, and I finished the race without inci-

48 pitch

BK pitch

64 pitch

As you can see, the BK gears are slightly finer than 48P but not as fine as 64P (all three pinions shown have 24 teeth).

dent. I'll install larger BK gears with the same ratio next time, but at least I know the gears are tough.

Is there an advantage to using these gears? If you run Losi vehicles, I think you'll find that the BK gears mesh better than aftermarket 48P pinions and stock Losi spurs, and there is that tough-to-quantify greater efficiency/punchiness benefit. Another potential benefit is a greater number of gearing options within the available range of maximum/minimum gear diameters that a vehicle can accept, but Trinity does not yet offer enough spur-gear sizes to take advantage of this.

—Peter Vieira ■

Converting your current 48P or 64P ratio to BK pitch

If you read the "Tech Insight" article on gearing in last month's issue, you already know how to match any ratio to any vehicle, but this chart makes it super easy to find the BK ratio that most closely matches your current setup. Here's how it works: find your current pinion/spur-gear combination under the appropriate pitch column, then install the corresponding BK gears in the same row. For example, if you have a 17/85T setup in 48 pitch, the closest numbers in the 48P column are 17.1 and 85.7. Slide over to the BK column, and it indicates you should install a 20T pinion and 100T spur. In this example, the original 48P setup and the BK combo are both perfect 5:1 ratios.

BK PITCH CONVERSION CHART

PINIONS		
48P	BK	64P
12.9	15	17.1
13.7	16	18.3
14.6	17	19.4
15.4	18	20.6
16.3	19	21.7
17.1	20	22.9
18.0	21	24.0
18.9	22	25.1
19.7	23	26.3
20.6	24	27.4
21.4	25	28.6
22.3	26	29.7
23.1	27	30.9
24.0	28	32.0
24.9	29	33.1
25.7	30	34.3
26.6	31	35.4

SPUR GEARS		
78.9	92	105.1
82.3	96	109.7
84.0	98	112.0
85.7	100	114.3

Likes

- Smooth mesh, quiet operation.
- Larger tooth counts can be used to achieve a given ratio.
- Large-diameter pinion setscrews.

Dislikes

- Fewer spur-gear options than available with 48P and 64P gears.

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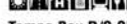
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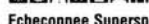
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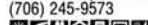
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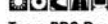
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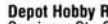
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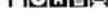
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Marty's R/C Hobby, 1335 E. Broadway, Bradley, IL 60915; Gail or Marty, (815) 933-8441



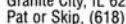
Monroe R/C Raceway, 26049 Ridgeland Ave., Monroeville, IL 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



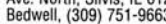
Outlaw R/C Speedway, 1614 Broadway, Mattoon, IL 61938; (217) 234-6229



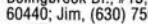
Pontoon Raceway, 3670 St. Rte. 111, Granite City, IL 62040-4304; Pat or Skip, (618) 931-1206



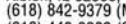
Quad Cities Radio Raceway, 541 1st Ave. North, Silvis, IL 61282; Tom Bedwell, (309) 751-9663



Radio-Active Raceway, 751 N. Bolingbrook Dr., #15, Bolingbrook, IL 60440; Jim, (630) 759-7557



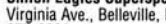
Rector's R/C Raceway, RR 3, Box 104, Albion, IL 62806; Tim Wolfe, (618) 842-9379 (M-F), (618) 446-3282 (Sun.)



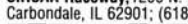
RMR Raceways, 19091 West Casey Rd., Libertyville, IL 60048; Ron Rawald, (847) 549-6963



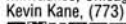
Shiloh Eagles Superspeedway, 308 N. Virginia Ave., Belleville, IL 62220; (618) 277-6030



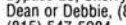
SIRCAR Raceway, 1200 N. Marion, Carbondale, IL 62901; (618) 549-5885



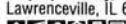
Stanton Hobby Shop, 4718 N. Milwaukee, Chicago, IL 60630; Kevin Kane, (773) 283-6446



Valley Farms R/C Raceway, 706 Bypass 20, Cherry Valley, IL 61016; Dean or Debbie, (815) 332-4516 or (815) 547-5984



Wep Speedway, RR #2, Box 44, Lawrenceville, IL 62439; Bill Poe



INDIANA

BD R/C Off-Road Racing, 13255 Chippewa, Mishawaka, IN 46545; Betty or Bob, (219) 257-1098; 02kie@aol.com;

www.angelfire.com/in/bdrcffroad/index.html

Bremen Racing Ent., 308 N. Bowen, Bremen, IN 46806; Dale Heuberger, (219) 546-3807



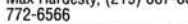
The Dirt Yard, 1117 W. Epler Ave., Indianapolis, IN 46217; Keith Dudas, (317) 786-6417



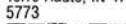
GM Raceway, 1651 W. Franklin St., Elkhart, IN 46516; Pete Russell, (219) 293-1827



Hardesty R/C Raceway, 11 East Plymouth St., Hamlet, IN 46532; Max Hardesty, (219) 867-8600 or (219) 772-6566



Hobby Barn Raceway, 1950 Springhill, Terre Haute, IN 47802-9694; (812) 299-5773



Hobbytown U.S.A., 5385 E. 82nd St., Indianapolis, IN 46250; Bill Scott, (317) 845-4106



Nitro R/C Speedway, 4310 West 400 South, Danville, IN 46122; John Webber, (317) 539-4413; email: nitrocr1@aol.com



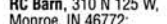
P&T Hobbies and Raceway, RR 2 (Hwy. 60), Mitchell, IN 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pnthobby@big-foot.com



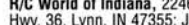
Race Street Hobbies, 1126 1/2 Race St., New Castle, IN 47362; Jim Burke, (765) 521-4888



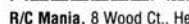
RC Barn, 310 N 125 W, Monroe, IN 46772; Mark Lengerich, (219) 692-6600



R/C World of Indiana, 2246 West U.S. Hwy. 36, Lynn, IN 47355; Joe Kolp, (765) 874-2464; e-mail: rcworld@glob-alsite.net; web: www.RCWORLD.com



R/C Mania, 8 Wood Ct., Hebron, IN 46341; Ron Trobaugh, (219) 996-6288 (shop); (219) 762-5365



The Rink, 7900 Whitcomb, Merrillville, IN 46410; Don Reiner, (219) 769-8113



Showtime Lot Racing, 606 Lower Huntington Rd., Fort Wayne, IN 46815; Mike Romines, (219) 478-6099



Summit Area Radio Cars (SARC), 7000 Red Haw Dr., Fort Wayne, IN 46805; John Kissel, (219) 492-2271



IOWA

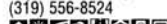
Delb's Speedway, 423 11th Ave. So., Clinton, IA 52732; Rusti's Miniatures and Hobbies, (319) 243-2697



Hobby Haven, 7672 Hickman Rd., Des Moines, IA 50322; Rick Marble, (515) 276-8785



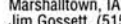
IROAR—Hawkey Downs Raceway, Hawkey Downs, 6th St. S.W., Cedar Rapids, IA 52404; Dave Kleinschrodt, (319) 556-8524



Manly R/C Club, Box 23 (Hwy. 65), Manly, IA 50456; Bruce Hill, (515) 454-2025



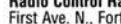
Mr. Car Raceway, P.O. Box 1112, Central Iowa Fairgrounds, Marshalltown, IA 50158; Jim Gossett, (515) 483-2234



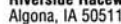
Outback Speedway, 108 West Iowa, Greenfield, IA 50849; Helens Enterprises, (515) 747-3064, trackside (515) 343-7004



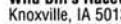
Radio Control Raceway Park, 2100 First Ave. N., Fort Dodge, IA 50501; Bernie Halverson, (515) 576-3780



Riverside Raceway, Veteran's Park, Algona, IA 50511; Mike Beisch, (515) 295-9352



Wild Bill's Raceway, 901 W. Jones, Knoxville, IA 50138; William Anderson Jr., (515) 842-5973



KANSAS

Ebersole Hobby and Raceway, 11417 W. Hwy. 54, Wichita, KS 67209; Sherri McWilliams, (785) 722-8888



Hobbytown USA, 2016 W. 23rd, Lawrence, KS 66046; Kevin Decembarus, (785) 865-0883



Mike's R/C Hobbies, 121 SE 29th St., Unit #3, Topeka, KS 66605; Mike Barnard, (913) 266-5767



Ottawa Outlaw Raceway, 114 South Main, Ottawa, KS 66067; Tom Wilson, (913) 242-1450



R/C Superdome and T.Q. Pro Shop, 14 E. Avenue A, Hutchinson, KS 67501; Cody or Joe, (316) 665-6633



R.C.R.C. Raceway of Salina, 1300 E. Crawford, Bill Burke Park, Salina, KS 67401; Calvin, (913) 823-9588



T.Q. Pro Shop, 14 E. Ave. A, Hutchinson, KS 67501; Cody Jandrakovic, (316) 665-6633



Northboro Speedway, 168 Main St., Rte. 20, Northboro, MA 01532; Bob Trimble, (508) 393-8087


MICHIGAN

D.R. R/C, 22789 Northline Rd., Taylor, MI 48180; Jim, (734) 671-9081


Freedom Hill R/C Raceway, 35372 Wellston, Sterling Heights, MI 48312; Jim McKenna, (810) 268-3996


Great Lakes R/C Racer's Club, 632 Plymough Ave. NE, Grand Rapids, MI 49505; (616) 948-9798 or (616) 948-9814; email: Gr8LksRacers@aol.com, www.members@aol.com/grtlscrcw/index.html


Hobby Hub, 5859 M99, Diamondale, MI 48821; Verne Goebble, (517) 337-9278 or (517) 351-5843


Jon's Hobby, 4739 E. Pickard, Mt. Pleasant, MI 48858; Jon Beutler, (517) 773-5412


JT Superspeedway, W. Golden Ave., Battle Creek, MI 49015; Jerry or Sam, (616) 965-0116


Larry's Performance R/Cs, 43665 Utica Rd., Sterling Heights, MI 48314; Larry, (810) 997-4840


Lazer RC Speedway, 2858 N. Wilmoth Hwy., Adrian, MI 49221; Russ Johnson, (517) 263-2806


Motor City Speedway, 1602523, mile Rd., Macomb Township, MI 48042; Gary Cornwell, (810) 677-2470


N.M.R.C.C. Raceway, Hobby Toy, Main St., Gaylord, MI 49735; Ed Schneider, (616) 732-3963


Ovalt's R/C Speedshop, 3920 N. U.S. 31 S., Traverse City, MI 49684; Jim Ovalt, (616) 947-6670


R.A.C.E. Inc., 3227 Mathews, Jackson, MI 49203; Sam Sprang, (517) 787-9161


Raw Roots Race Tracks, 14623 East Crosswell, 1/4 mile north on 152nd (off U.S. 31), West Olive, MI 49460; Roy Bennink, (616) 399-9338


R&L Hobbies & Racing, 9782 Portage Rd., Portage, MI 49002; Rex Simpson, (616) 323-3686; fax (616) 329-1744; email: rinfo@rhhobbies.com; www.rhhobbies.com


Robby's Hobbys, 1106 Columbus, Bay City, MI 48708; Dan, (517) 893-2712


Rodgers R/C Raceway, 7463 Ridge Rd., Britton, MI 49229; George Rodgers, (517) 451-8301


Superior R/C Raceway, 160 S. County Road 553, Lot 173, Gwinn, MI 49841; Frank Felster, (906) 346-7225


Thumb Raceway, 3441 Main St., Marlette, MI 48453; Jim Wilson, (517) 635-7848


Vicksburg Off-Road R/C Raceway, 50201 Silver St., Vicksburg, MI 49097; Tim, (616) 323-7963


T.J.'s RC Raceway, Rt. 2, Box 22C, Luther, MI 49656; Tod Smant, (616) 797-8035


Village Hobbies-n-Crafts, 195 N. Elm, Hesperia, MI 49421; Alan or Fran, (616) 854-1374


Village R/C Raceway, Prairie Ronde St., Decatur, MI 49045; Chuck Nolke, (616) 423-7878


Washtenaw R/C Raceway, Ypsilanti, MI 48198; Jim Rousseau, (734) 395-5048


Willis Outdoor R/C Racetrack, 13922 Oakville-Waltz Rd., Willis, MI 48191; Mike Higgins, (734) 587-2012


MINNESOTA

Bemidji R/C, 1015 Miles Ave. S.E., Bemidji, MN 56601; Russ or Ryan, (218) 751-1629


Car Town USA, 2822 Piedmont Ave., Duluth, MN 55811; Roger Deloach, (218) 727-6248


Central RC, 1620 Central Ave., Minneapolis, MN 55330; Doug Ringold, (612) 781-1640


Country R/C Raceway Park, 24214 325th St., Belview, MN 56214-8115; Charles L. Steff, (507) 641-8115


Duey's Hobbies & R/C Raceway, 6600 Cahill Ave., Inver Grove Heights, MN 55076; Duey Carlson, (612) 450-1721


Grand Rapids R/C Speedway, 2209 Hwy. 2 East, Grand Rapids, MN 55744; Aaron Voges, (218) 326-6751


Granite City R/C Speedway, 3555 Shadowwood Dr. N.E., East Hwy. 23, Sauk Rapids, MN 56379; Brett Donahue, (320) 251-6980


J's Radio Control Race Park, 22994 290th Ave., Starbuck, MN 56381; Jay Campbell, (320) 239-4827


Kevin's Private Off-Road Raceway, 702 So. Washington Ave., Crookston, MN 56716-2317; Kevin Altepeter, (218) 281-7523 or (218) 281-7491; email: kevinles@rrv.net; (note: registration required for permission of use)


Northwoods Hobby Raceway, 2638 Hwy. 25 North, Brainerd, MN 56401; Tom Grogg, (218) 829-9257


Ray's Raceway Park, 105 3rd Ave. NE, Glenwood, MN 56334; Dan Winter, (320) 634-5246


R/C Racing World, 235 Main Ave. North, Harmony, MN 55939; Mark McKay, (507) 886-5931 or (507) 886-2224


Red Barn RC Raceway, Rt. 4, Box 333, Mankato, MN 56001; Rusty Weiss, (507) 345-8972


Southside Speedway, 2241 Marion Rd. SE, Rochester, MN 55904; Kevin Guy, (507) 281-3233


Sport Zone RC Race Park, 32339 Harris Town Rd., Grand Rapids, MN 55744; Greg, (218) 326-8956


Time R/C Raceway, 20 West Lake St., Chisholm, MN 55719; RV, (218) 254-4321


MISSISSIPPI

Joe McFaden Hobbies, 5531 Fox Meadow Dr., Meridian, MS 39307; Joe McFaden, (601) 483-7000


Small Cars Unlimited, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST; www.smallcarsunlimited.com


MISSOURI

All Seasons Hobby, 29 O'Fallon Square, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767


B&L Hobbies & Raceway, 2800 Anchor Dr., Park Hills, MO 63061; Bob Marler, (573) 431-9444


Fire Mountain Raceway, 8647 Commercial Blvd., Pevely, MO 63070; Dan Gordon, (314) 475-6449


Greentree R/C Racepark, St. Louis Dirt Burners R/C Club, Marshall Rd., Kirkwood, MO; (314) 831-2194


Hobbies 'N' Stuff Raceway, 204 Mall Pkwy., Wentzville, MO 63385; Tim Satchwill or Crandall Olds, (314) 327-6006


North Missouri Raceway, 223 Graves St., Chillicothe, MO 64601; Billy Johnston, (660) 646-1120


Novelty R/C Raceway, Rt. 1, Box 132A, Novelty, MO 63460; Rex or Jena, (660) 739-4546; email: rexjen@marktwin.net


Ozark Mountain Speedway, Rt. #2, Box 50, H-Highway and County Rd. 31, Noel, MO 64854; Clayton Younker, (417) 475-6222


Ozarks R/C Raceway, Hwy 13N, Brighton, MO 65781; Rex Rhodes or Ron Hawkins, (417) 742-4376 or (417) 742-7223


Real Blue Vue Speedway, 12019 E. 47th St., Kansas City, MO 64133; Mark Randol, (816) 358-0238


Real R/C Raceway, 24204 State Rt. 58, Pleasant Hill, MO 64080; Steve Hale, (816) 540-5584


MONTANA

Stormer Raceway & Slot Motorplex, P.O. Box 126, Hwy 2 East, Glasgow, MT 59230; (406) 228-4569


NEBRASKA

Goodyear Speedway and Off-Road, 4021 North 56th, Lincoln, NE 68510; Tom or Bob, (402) 464-5172


Hadar R/C Raceway, 55192 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922


Hobby Town USA Raceway, N. 1st St. & Cornhusker Hwy., Lincoln, NE 68508; Ben Smith, (402) 434-5056


Mr. Bill's, 450 West 2nd St., Hastings, NE 68901; Bill J. Ries, (402) 462-4865


O.N.R.O.A.D., 3307 N. 58 St., Omaha, NE 68104; Cook Jacobs, (402) 556-8674


OTWG Carpet Raceway, 55129 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922


RC Motorsport Off-Road Raceway, 5600 Mass Rd., Papillion (Omaha), NE 68133; Marty Stepanek, (402) 593-6133


Salvation Army South Corps, 4032 Harrison St., Omaha, NE 68164; (402) 734-3414; fax (402) 734-3415


T & T Raceway, 476 26th Ave., Columbus, NE 68601; Tom, (402) 564-9216


The Speed Zone, 1524 Atokad Dr., South Sioux City, NE 68776; Rob Murdock, (712) 428-4679, or Jim Carson, (712) 274-7731


Wacha's R.C. Speedway, 1823 23rd St., Columbus, NE 68601; Tom Smith, (402) 564-9216


NEVADA

Bill's Hobby Shop, 1000 N. Nellis Blvd., Las Vegas, NV 89110; Bill Schultz, (702) 531-3282; website: www.billshobbyshop.com


Dansey's Indoor R/C & Hobbies, 741 N. Nellis, Las Vegas, NV; David Lugo, (702) 453-RACE, (888) 675-8963; www.danseys.com


Lizard Raceway, P.O. Box 1248, Verdi, NV 89439; Jeff Griffin, (702) 345-6573


NEW HAMPSHIRE

Axis Racing R/C Dragway, 4197 High St., Exeter, NH 03833; Dan Peterson, (603) 659-4877


Economy R/C Speedway, 4 Maple St., Winchester, NH 03470; Harold Thomas, (603) 239-4482 or 239-6470


North Haverhill R/C Racing, Main St., N. Haverhill, NH 03774; Shelly White, 111 Golf Links Rd., Wells River, VT 05081; Todd White, (802) 757-2579


Robert's Railroad & Hobbies, 1335 1st NH Turnpike—Rt. 4, Northwood, NH 03261; Robert M. Jeffers Jr., (603) 942-5193


RT 106 Racepark, 743 Clough Mill Rd., Pembroke, NH 03275; Fred Farwell, (603) 224-RACE


NEW JERSEY

American Raceway, 142 Wilson Ave., Englishtown, NJ 07726; Doug Venner, (732) 446-3737; email: DMC12@prodigy.net


America's Hobby Center Inc., 8300 Tonnelle Ave., North Bergen, NJ 07047; John Many, (201) 662-0777


Checkerboard Raceways, P.O. Box 240, Elwood, NJ 08217; Ray Murray, (609) 629-4809


Family Hobbies Raceway, 3576 N.W. Blvd. & Weymouth Rd., Vineland, NJ 08360; Linda Vogel, (609) 696-5790


Jackson R/C Racing, P.O. Box 565, Christopher Columbus Blvd., Jackson, NJ 08527; Al Sodano, (732) 364-6422, or Ed, (732) 928-8963


Jefferson Speedway, 5494 Berkshire Valley Rd., Oak Ridge, NJ 07438; (201) 697-7525


Jerry's Hobby Center & Raceway, 336 Rt. 22W, Greenbrook, NJ 08812; Jerry or Gary, (908) 752-6030


LBRA Track, 392 Warburton Pl., Long Branch, NJ 07740; (908) 222-5122


Millville R/C Oval, 114 N. High St., Millville, NJ 08332; William Denstoz, (609) 327-4640


On Trax Hobbies, 3101 Rte. 70, Browns Mills, NJ 08015; Joseph DiGirolamo, (609) 735-0422


South Jersey Cost Controlled Racing, 25 Jackson Ln., Sicklerville, NJ 08081; Ray Murray, (609) 629-4809


The Race Place, 1151 Hwy. 33, Farmingdale, NJ 07731; John Fary, (908) 938-5215


NEW MEXICO

Charlie's Hobby Shop, 225 E. Idaho, Ste. 11, Las Cruces, NM 88005; Kim, (505) 541-1097


Las Cruces R/C Racer's Association, Meerscheidt Recreation Center, Walnut and Hadley by BMX, Las Cruces, NM 88001; D.J. Clark, (505) 546-4269; email: jade@zianet.com; www.zianet.com/jade/lcrrca.htm;


NEW YORK

B&D Rally, 92 Fairview Ave., Bayport, NY 11705; Daniel Spotteck, (516) 472-9208


Barnstormers Speedway, 205 Gray Court Rd., Chester, NY 10918; Lou, (914) 469-6468; trackside (914) 469-8206


Brennan's R/C Hobbies, 6368 State Rt. 5, Vernon, NY; Bill or Tom Brennan (315) 829-4930


Brownie's Pro & Sport Hobbies, 124 Bennett St., Staten Island, NY 10302-1426; John Brown, (718) 727-2194


Bruckner Racing, 2908 Bruckner Blvd., Bronx, NY 10465; Thomas Baffers Sr., (800) 288-8185


BSK Hobbies & Raceway, 120 Main St., Hornell, NY 14843; Bruce Harris, (607) 324-4011, (800) 603-0197


C&D Raceway, 12542 NYS Rte. 12E, Chaumont, NY 13622; Chris or Don Bourquin, (315) 649-5403


Capital District R/C Racers, 27 Venus Dr., Albany, NY 12211; Peter Willis, (518) 482-7128


Chipmunk Hill R/C Speedway, 217 Pine St., Theresa, NY 13691; Ted or Pete Thores, (315) 628-5065


Competition Hobby Speedway, 1006 Loudon Rd., Rte. 9, Latham, NY 12047; Howie or John, (518) 786-3622


East Coast Hobbies Race Club, Floyd Bennett Field, Brooklyn, NY 11204, for mail, 2515-65th St., Brooklyn, NY 11204; Brian Cardella, (718) 627-3814


Foothills R/C Speedway, 3200 Chestnut St., Oneonta, NY 13820; Dave Osterhoot, (607) 432-5098


Frogtown Hobbies, Rt. 37, Mini Pines Village, Hogsburg, NY 13655; Dennis, (518) 358-3686


Hacr's Hobbies & Raceways, 120 Cayuga St., Canal View Mall, Fulton, NY 13069; Jack La

R/C Competition Corner, 2202 Brewerton Rd., Mattydale, NY 13211; Lori and Cos Cirriello, (315) 455-8718



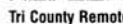
Silver State R/C Club, Centennial Park, Carson City, NV 89501; (702) 853-3953



Southern Tier Raceway, 88 Paige St., Owego, NY 13827; Anita Harding, (607) 687-5395



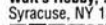
South Shore Hobby & Raceway, 464 East Main St., Patchogue, NY 11772; Benny or Bonnie, (516) 758-5567



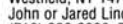
Tri County Remote Control Car Club, 33 West Decker St., Johnstown, NY 12095; Tom Leville, (518) 725-1279



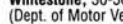
TARMAC—Ultimate R/C Raceways, 2830 Mountain View Rd., Poughkeepsie, NY 12603; Todd, (914) 342-5409; Greg, (914) 528-5084; trackside, (914) 454-8276; www.tarmacraceway.com



Wall's Hobby, 2 Dwight Park Dr., Syracuse, NY 13209; (315) 453-2291



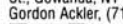
Westfield R.C. Speedway, 27 Clark St., Westfield, NY 14787; John or Jared Lindstrom, (716) 326-2339; 716-326-2309



Whitestone, 30-56 Whitestone Expy. (Dept. of Motor Vehicles), Flushing, NY 11374; Rudolf Arilla, (718) 966-6155



Willis Hobbies R/C Speedway, 300 Willis Ave., Mineola, NY 11501; Ken Ford, (516) 746-3944



ZOAR Road Speedway, 15318 Armes Ct., Gowanda, NY 14070; David & Gordon Ackler, (716) 532-9463



NORTH CAROLINA

A&J R/C Models, 2051 Anthony Rd., Burlington, NC 27215; Jerry Loye or Andrea Thompson, (336) 227-4556; fax (910) 227-1001



The Antique Barn, 2810 Forest Hills Rd., Wilson, NC 27893; (252) 237-6778



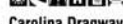
Atlantic Coast R.C., 8-A Lockhead Ct., Greensboro, NC 27409; Charlie Higgins or Harry Johnson, (336) 664-1277



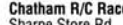
Badin Shore Raceway, 1730 Jackson Lake Rd., High Point, NC 27633; Jimmy or Tim Martin, fax (910) 431-6407



C/C Hobby Speedway, 8358 U.S. Hwy. 220 Bus. N., Randleman, NC 27317; Steve & Mary Cox, (910) 495-3482



C/W R/C Speedway, 1297 Charlotte Hwy., Asheville, NC 28730; Billy or Tim, (828) 684-0061



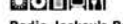
Carolina Dragway, 1555 Turkey Hwy., Clinton, NC 28326; (910) 592-9489



Chatham R/C Raceway, 326 Reno Sharpe Store Rd., Bear Creek, NC 27207; Dwight Fields, (919) 898-2991



Green Flag RC Raceway, 107 Harley Rd., Wilmington, NC 28401; Mike McLemore, (910) 452-1620



R & D Speedway, 418 Main St., Tarboro, NC 27886; John Dupree, (919) 823-2294

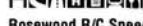


Ride & Slide R/C Raceway, 5319 Yarkin Rd., Fayetteville, NC 28303; Bill Culbertson, (910) 867-4202

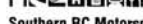


Radio Jockey's Parkway, "RJ's," Rt. 9, Box 651, Fay, NC 28301; www.wave-net.net/mshutt; Tony Starling, (910) 486-4820

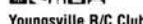
R.C.R. Speedway, 1415 Henderson Grove Church Rd., Salisbury, NC 28147; Ronnie Linker, (704) 637-2565



Rosewood R/C Speedway, 651 Community Dr., Goldsboro, NC 27530; Glenn Elam, (919) 731-4734



Southern RC Motorsports Club, Hwy. 17S., P.O. Box 1651, Shallotte, NC 28459; Mark Whitt, (910) 754-4902 or Eddie Ferster, (910) 754-8528

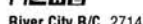


Youngsville R/C Club, 6516 NC 96 Hwy. W., Youngsville, NC 27596; James Ray, (919) 556-0446



NORTH DAKOTA

Northern Mini Racers, 1000 36th St. S.E., Minot, ND 58702; Mike, (701) 838-5818



River City R/C, 2714 Main Ave., Fargo, ND 58103; Chris, (701) 235-1272

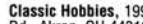


OHIO

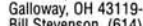
AK Hobby and Raceway, 3826 North Bend, Cincinnati, OH 45211; Tim Tolle, (513) 661-7080



American Ohio Sprint Car, 1708 Empire Rd., Wickliffe, OH 44092; Gary Waldheim, (440) 944-9966



Classic Hobbies, 1994 E. Waterloo Rd., Akron, OH 44312; Walt Ellis, (330) 733-6400



CORCARS Sams Club, 128 Amity Rd., Galloway, OH 43119-8732; Bill Stevenson, (614) 870-7159



Columbus R/C Racing Club (C.R.C.R.C.), Franklin County Fairgrounds, Hilliard, OH 43026; Jeff Crowell, (614) 236-1783



D&J R/C Raceway, 801 W. Market St., Orrville, OH 44667; Don Yoder or Mark Nussbaum, (330) 682-4266



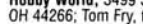
Full Throttle Raceway, 600 Mt. Moriah Dr., Cincinnati, OH 45255; Bill Dolch, (513) 943-9009 or via pager at (513) 730-1073



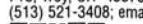
Glass City Radio Control, 2620 Ivy Pl., Toledo, OH 43613; Frank Johnson, (419) 472-1286



Greentown R/C Raceway, 3353 Perrydale, Greentown, OH 44630; Chuck Lambert, (330) 364-6585



Hobby Shop Raceway, 2096 Miamisburg Centerville Rd., Centerville, OH 45459; The Hobby Shop, (937) 436-6161



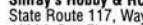
Hobby World, 3499 SR 59, Ravenna, OH 44266; Tom Fry, fax (330) 296-0894



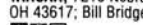
J & L R/C Raceway, 5342 W. St. Rt. 718, Troy, OH 45373; Mike Wegman, (513) 521-3408; email: wegs@one.net



Lafferty R/C Raceway, Box 153, 70228 Hurrah St., Lafferty, OH 43951; Chris Christman, (740) 968-4818



Mid American Raceway, 13150 Airport Hwy., Swanton, OH 43558; Bill or Chuck, (419) 475-9459



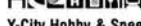
Nothing But Air R.C. Track, 34632 True Rd., Logan, OH 43138; Gary Lloyd, (740) 385-0288



Shiray's Hobby & RC Raceway, 19930 State Route 117, Waynesfield, OH 45896; Ray Zimmerman, (419) 568-8055

TARCAR, 7216 Nebraska Ave., Toledo, OH 43617; Bill Bridges, (419) 826-3859

Van Wert R/C Raceway, 144 E. Main St. (above Hoverman Music), Van Wert, OH 45891; Mark Davis, (419) 232-2112



Y-City Hobby & Speedway, 120 S. 6th St., Zanesville, OH 43701; Kevin McKenna, (674) 455-3025



OKLAHOMA

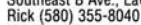
Adams Creek R/C Speedway, 5207 S. 194th E. Ave., Broken Arrow, OK 74014; John Beighle, (918) 355-1416



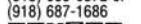
Competition R/C, 100 S.E. 89th, Oklahoma City, OK 73149; James or Louise Brown, (405) 634-0809



Enid R/C Speedway, 1821 S. Van Buren (Hwy 81), Enid, OK 73701; Bob, (800) 233-3344 or (580) 234-7666



R/C Speedway of Lawton, 202 Southeast B Ave., Lawton, OK 73501; Rick, (580) 355-8040

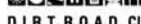


Wild Country Speedway, 127 S. Main, Porter, OK 74454; Charles McCollough, (918) 685-0372 or (918) 687-1686



OREGON

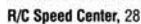
Competition Racing Association, 17941 N.E. Gleason, Portland, OR 97230; Mark Taylor, (503) 761-1334



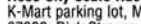
D.I.R.T. R.O.A.D. Club, 65540 73rd St., Bend, OR 97701; Daleyne and Edward Giletz, (541) 388-2932 or (800) 475-6040, ext. 777 (at 2nd dial tone, enter ext.); email: blue@coinet.com



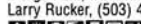
R/C Plus Hobbies Raceway, 1857 25th St. S.E., Salem, OR 97302; Ron Smith, (503) 364-9188



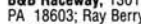
R/C Speed Center, 2810 N. Pacific Hwy., Medford, OR 97501; Gene and Betty Jean Skelton, (541) 779-8298



Rose City Scale Racing, Highway 224, K-Mart parking lot, Milwaukie, OR 97222; Rick Strauss, (503) 631-2929



Yamhill County R/C Car Club, 722 Morgan Ln., McMinnville, OR 97128; Larry Rucker, (503) 472-7234

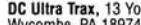


PENNSYLVANIA

B&B Raceway, 1301 Pine St., Berwick, PA 18603; Ray Berry Jr., (570) 759-3469



Courtview Raceway, 20 S. Main Street (lower level), Washington, PA 15301; Aaron Stimmel Jr., (724) 225-4302



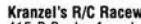
DC Ultra Trax, 13 York Rd., Wycombe, PA 18974; David Cowan, (215) 672-5200



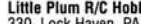
D&D Hobby Shop, 305 3rd St., Rouseville, PA 16344; (814) 676-4475



Dreamboat Hobbies, 2810 Pennsylvania Ave. W., Warren, PA 16365; Louie Dussia, (814) 723-8052



Koontz's Home & Hobby Center, 1205 Hoover St., Pittsburgh, PA 15204; (412) 331-3866



Kranzel's R/C Raceway & Hobbies, 415-B Bosler Ave., Lemoyne, PA 17043; David or Stuart Kranzel, (717) 737-7223



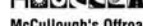
Little Plum R/C Hobbies, RR 1, Box 330, Lock Haven, PA 17745; Larry Duck, (570) 769-1984



Lugnut Raceway, 1713 Bethlehem Pike, Hatfield, PA 19440; Bill Henning or Kathy Anderson, (215) 822-5831



Marshall's R/C Raceway, RR 4, Box 640, Honesdale, PA 18431; Bill or Dot Marshall, (570) 729-7458



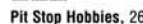
McCullough's Offroad, 108 Callen Rd., Sarver, PA 16055; Doug McCullough, (724) 352-0116; email: DMCCul323@aol.com



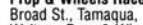
The Mushroom Bowl, 960 W. Cypress St., Kennett Square, PA 19348; Bruce or Drew, (610) 444-1850



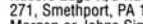
Pinion Twisters, 3M Plant, Green Ln. and Mitchell, Bristol, PA 19007; Mark, (215) 632-2344 or Tony, (215) 742-3560



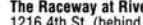
Pit Stop Hobbies, 262 W. Main St., Mount Joy, PA 17552; James Stoudt Jr., (717) 653-6222



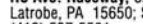
Prop & Wheels Raceway, 139 W. Broad St., Tamaqua, PA 18252; Gil Walters, Prop & Wheels Hobbies, (570) 668-2288



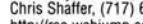
Racers Edge R/C Racing, RR#1, Box 271, Smethport, PA 16749; Rick Morgan or Johna Simar, (814) 887-2269; email: morg@penn.com; web: users.penn.com/~morg/track.html



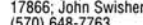
The Raceway at River Junction, 1216 4th St. (behind cemetery), Beaver, PA 15009; (724) 728-5571



RC Ave. Raceway, 324 McKinley Ave., Latrobe, PA 15650; Scott Smith, (412) 537-5501



RC Outfitters RCO Raceway, 519 Broadway, Hanover, PA 17331; Chris Shaffer, (717) 633-9490; http://rco.webjump.com



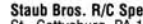
R/C Pro III, 910 Chestnut St., Coal Twp. (Shamokin), Shamokin, PA 17866; John Swisher, (570) 648-7763



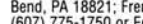
Riverside Raceway, Penna. Ave. W. & Hickory, Warren, PA 16365; Jeff, (814) 723-4211



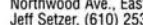
S.A. Hi Banks, Hahn's Dairy Rd., Palmyerton, PA 18071; Scott Andrews, (610) 826-4583



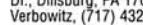
Somerset Hobby Shop Outlet, 4309 Glades Pike, Somerset, PA 15501; Bob Rhodes, (814) 445-6214



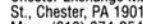
Staub Bros. R/C Speedway, 31 Locust St., Gettysburg, PA 17325; Todd or Scott Staub, (717) 334-5445



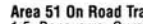
TnT Raceway, Randolph Rd., Great Bend, PA 18821; Frenchie, (607) 775-1750 or Ed Kraft, (570) 967-2604



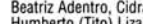
Trains & Lanes Raceway, 3825 Northwood Ave., Easton, PA 18045; Jeff Setzer, (610) 253-8850, (800) 447-4891



Willow Mill Speedway, 37 N. Season's Dr., Dillsburg, PA 17019; George Verbowitz, (717) 432-4445

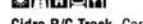


World A.T.L.A.S./P.A.R.C.E. R/C Raceway Hobby Shop & R/C Club, Chester Exchange Mall, 10th & Morten St., Chester, PA 19013; Darryl, Lee or Marc, (610) 874-2540



PUERTO RICO

Area 51 On Road Track, Carr 931 KM 1.5, Bonavaro, Gurabo, PR 00745; (787) 739-1572



Cidra R/C Track, Carr 7787 KM 1.6, Bo Beatriz Adentro, Cidra, PR 00739; Humberto (Tito) Lizardi, (787) 739-1572



Dorado Offroad R/C Track, Pista Atletica Bo. Higüillar, Dorado, PR 00646; Roberto Lamoso/Jaime Ramos, (809) 796-5603 or (809) 796-1734



Hacienda Muñoz R/C Track, Carr. #14, Juana Diaz, PR 00795; (809) 837-7083



TENNESSEE

D&M's Downtown Raceway, 2703 U.S. Hwy. 411S, Maryville, TN 37303; (423) 681-8919

Futrell's R/C Hobby Shop, 1715 Jackson Ave., Seymour, TN 37865; Dan Futrell, (423) 908-9526

Hobby Town USA, 2000 Mallory Ln., Franklin, TN 37067; Bobby Mills, (615) 771-7441

Interstate Raceway, 5237 Highway 126, Blountville, TN 37617; Dale or Mark, (423) 323-1513; mkstarnz@intermediatn.net

MID-South Racing Association, 9155 Hwy. 72 (Poplar Ave.), Germantown, TN 38138-7903; (901) 757-8774

MSA Racing, 120 Villageaway, Crossville, TN, 38555; D.R. Findley, (931) 456-0027

R & R Racing Portable Track, RR3, Box 34, Linden, TN 37096; Ross or Ron, (931) 589-5433

TnT Raceway, 643 Loop Hollow Rd., New Tazewell, TN 37825; Cliff Swett, (423) 869-8942

W.O.W. Raceway, 59 Luray Rd., Beech Bluff, TN 38313; Brad Jones, (901) 423-4784; email: wovmngn1@abac.com; http://go.to/wowracing

TEXAS

215 Speedway, 1814 County Rd. 215, Abilene, TX 79602; Clyde Gardner, (915) 673-2351

B&B R/C Hobbies, 700 East 4th, Big Spring, TX 79720; Walter Bumbulis, (915) 263-1790

Big Mike's R/C Raceway, 1405 W. Cotton St. (behind the Locker Room), Longview, TX 75604; (903) 297-7814

Comanche Trail RC Park, City Park, Big Spring, TX 79720; Allen Nichols, (915) 263-4241

Discount Hobbies, 1722A West Anderson Loop, Austin, TX 78757; Tony Bermudez, (512) 458-2324

Drycreek Raceway, 5903 Co. Rd. 2297, Quinlan, TX 75474; Micky Alphin, (903) 883-4060

Eastex Raceway, 45000 Hwy. 59 N., New Caney, TX 77357; Brent Mahaffy, (713) 399-9777

Finish Line Raceway, 2775 N. Hwy. 360, Ste. 637, Grand Prairie, TX 75050; Steve Manning, (817) 652-3340

Hal's Hobby Raceway, 1440 Bessemer, El Paso, TX 79936; (915) 591-2213

Hobbytown USA, 999 E. Basse Rd., Ste. 177, San Antonio, TX 78209; Joe Sena or Clark Baisdon, (210) 829-8697; fax (210) 829-8707

Hot Rod's Raceway, 4218 Boston Ave., Lubbock, TX 79413; Rodney, (806) 797-9964

Issac's Race Track, 18177 Gulf Frwy., Houston, TX 77598; Issac Ben-Ezra, (281) 488-8697

MBRC Off-Road Raceway, 204 D&E Valley Ln., Kennedale, TX 76060; Mike Battaile, (817) 563-1900

Mammoth R/C Racing, 4221 Spencer, Pasadena, TX 77504; John, (713) 946-2522

Mike's Hobby Shop Superstore and Raceway, 1605 Crescent Cir., Carrollton, TX 75006; (972) 242-4930; www.mikeshobbyshop.com

Performance Raceway, 1106C Witte Rd., Houston, TX 77055; Jorge or Terry, (713) 464-4458

Rev It Up Raceway Practice Track, 3076 Kellar Rd., Smithville, TX 78957; Rev, Alton T. Edwards, (512) 237-5903

Rick's R/C Raceway, 238 Scenic Loop, Boerne, TX 78009; Rick, (210) 981-2245 or Rich, (210) 590-1805

Star/Car Raceway, 5802 Patton St., Corpus Christi, TX 78415; Glen Stead, (512) 949-8525; Race Hotline, (512) 881-6105

T&T R/C Cars, 3420 Ave. K., Suite 154, Plano, TX 75074; Joe Sullivan, (972) 633-2470

Texas Speedway, 67073 Chimney Rock, Bellaire, TX 77401; (713) 661-7137; www.i-i-hobby.com

T.Q. Offroad Raceway, 6236 Quail, El Paso, TX 79924; Eren Saenz, (915) 821-7522

Warehouse Radio Controlled Raceway, 5119 Plains Blvd., Amarillo, TX 79101; Craig or Darren Waddell, (806) 356-9080

W.E.S. Hobby Race, 980 S. Fourth St., Beaumont, TX 77701; Edmond Richards, (409) 839-4929

UTAH

Intermountain R/C Raceway, 8481 W. 2700 S., Magna, UT 84044; David Mott, (801) 250-8303

Hobby Haven Raceway, 450 W. Coal Creek, Cedar City, UT 84720; Ryan, (435) 586-7316

Payson R/C Raceway, 955 S. Main, Payson, UT 84651; Gus Wood, (801) 224-3852 and Lasca Wood, (801) 222-8677

Vision Hobby, 352 N. State St., Orem, UT 84057; Ken Rice, (801) 226-6226

WOR R/C Raceway, 3170 Brinker Ave., Ogden, UT 84401; Brian Worton, (801) 393-2530

VERMONT

Barre Town R/C Club, 14 S. Main St., Wall St. Complex, Barre, VT 05641; Russ or Pete, (802) 888-2860 or (802) 476-9458

Bradford R/C Racing, Main St., Bradford, VT 05033; Seth Bean, (802) 222-9674

Empire Hobbies Off-Road Raceway, 272 North Main St., Saint Albans, VT 05478; Scott or Jen, (877) 4-HOBBIE; email: mpirhobe@togethrn.net

Stoughton Pond Raceway, Stoughton Pond Rd., Perkinsville, VT 05151; Rick Adams, (802) 263-9321

VIRGINIA

Brad's Hobbies, 1105 Greenville Ave., Staunton, VA 24401; Brad, (540) 885-3642

Brown Brothers Hobbies, 924 N. Main Street, Dumfries, VA 22026; Joel or Bob Brown, (703) 221-5746

Cooper's R/C Race Center, 4000 Sago Rd. (969), Chatham, VA 24531; Norris Cooper, (804) 724-7342 or (804) 724-4182; website: http://coopersrc.virtu-alave.net

DCRW Raceway, Debbie's RC World, 2200 Commerce Pkwy., Virginia Beach, VA 23454; Les Modlin, (757) 340-6681

Gloucester Scale Hobbies, 2352 George Washington Memorial Hwy., Hayes Plaza, Hayes, VA 23072; Rob Thein, (804) 642-3484

Hampton RC Speedway, 1920 E. Pembroke Ave., Hampton, VA 23663; Steve Long or Mickey Kern, (757) 723-1884; website: www.fortunecity.com/olympia/norman/26/

K & W Hobby and Sports, 5186 Nine Mile Rd., Richmond, VA 23223; Ross Martin, (804) 737-3904

KC's Radio Control & Repair, Rt. 4, Box 312, Trents Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596

Olde Towne Hobby Shoppe, 9105 Center St., Manassas, VA 22110; Arnie Levine, (703) 369-1197

Race World Hobbies, 6102 Lakeside Ave., Richmond, VA 23228; Larry Boyd, (804) 553-8040

The Racer's Edge, 1230 West Main St., Danville, VA 24541; Al Harville, (804) 792-6011; email: webmaster@theracer-edge.virtualave.net; http://theracer-edge.virtualave.net

Roadmasters/Rick's Hobbies, 12201 Balls Ford Ave., Manassas, VA 22110; Rick, (703) 330-6833

Shamroc Raceway, 106 Cheviot Pl., Stephens City, VA 22655; Scott Janow, (540) 869-3551; note: track is located in Winchester, VA

Thunder Road RC Racing, P.O. Box 1022, Troy, VA 22974-1022; James Palmer, (804) 589-8174

The Tiltyard, 6994 Tiltyard Dr., Dayton, VA 22821; (540) 828-3476; www.tiltyard.com; tiltyard@rica.net

Trainlano R/C Racing, 5661 Shoulders Hill Rd., Suffolk, VA 23435; Frank Stevens, (757) 488-5454

WASHINGTON

A-Main Raceway, 14011 N.E. 3rd Ct., Vancouver, WA 98685; Monty Coleman, (360) 571-8404

Bear Creek Raceway, 6319 Maltby Rd., Woodinville, WA 98072; Nathan Brockway, (425) 398-0140

Burien Toyota R/C, 15025 1st Ave. South, Seattle, WA 98148; Ray Meek, (800) 654-6456

Cedardale Raceway, 1673 Cedardale Rd., Mount Vernon, WA 98273; Joe Madonia, (360) 659-0072; email: getshell@halcyon.com

Fantasy World Raceway, 7901 S. Hosmer, Tacoma, WA 98408; Dave Kleinman, (253) 473-6223; www.fantasyworldhobbies.com

Four Seasons R/C Racing, 2941 Sleater Kinney Rd. N.E., Olympia, WA 98506; Gary and Sharon Brown, (360) 491-2430

Hank Perry Raceway, 1901 N. Sullivan Rd., Spokane, WA 99023; Thom Mullins, (509) 928-2009

Race City, 125 E. Main St., Auburn, WA 98002; Craig Haslebach, (253) 939-2515; trackside (253) 939-2515

SARCAR Club, 700 Renton Village Pl., Renton, WA; Darylene Dennon, (425) 483-8210

Spokane Indoor Raceway, 6422 E. 2nd Ave., Spokane, WA 99212; Dave Mapston, (509) 534-RACE

Tacoma R/C Raceway, 6305 6th Ave., Tacoma, WA 98406; Scott Brown, (253) 565-1935

Rain City RC Raceway, 3616 South Rd., Suite A-3, Mukilteo, WA 98275; Peter, Andrew or Debbie, (425) 438-2454; ibauser@gte.net; www.raincity-raceway.com

Ultimate R/C Raceway, 907 Cole St. #3, Enumclaw, WA 98022; Dan Daugherty, (360) 802-2388

West Coast Hobby & Raceway, 2239 Stevens Dr., Richland, WA 98837; Darren Shank, (509) 375-4995

Zep's Hobbies & Raceway, 530 Interlake, Moses Lake, WA 98837; Steve Ralph, (509) 765-8191

WEST VIRGINIA

Burr-Fab Raceway, 90 Davis St., West Union, WV 26456; Mark Travis, (304) 873-2487

Fulton's R/C Raceway, 2646 Chapline St., Wheeling, WV 26003; James Fulton, (304) 233-5355

Left Turn Hobbies, 100 Saco Ln. (by Post Office), Glen White, WV 25849; Stretch, (304) 255-3930

Race Zone, Hopewell Rd., Rt. 8, Box 343A, Fairmont, WV 26554; Joe Clutter, (304) 368-1000

WISCONSIN

ABC R/C Inc. & Raceway, 244 W. Main St., Waukesha, WI 53186; Dick Mathieson, (414) 542-1245; www.abchobby.com; email: help@abchobby.com

Best's Hobbies, 2700 West College Ave., Appleton, WI 54914; Peggy, (920) 734-5244

Dirt Heaven Hobby and Raceway, 6028 County Rd. K, New Franken, WI 54229; sales@dirtheaven.com; www.dirtheaven.com

Gary's Hobby Center, 3701 Durand Ave., Racine, WI 53403; Bill Phalen, (414) 554-8884

Hobbytown USA - Revolution, Memorial Mall, 3347 Kohler Memorial Dr., #D2, Sheboygan, WI53081; Kenny, (920) 452-0801

Mid-West Tri-Clone, 3745 Shuster, West Bend, WI 53095; Tom Holz, (414) 334-0429

Pro-Star Racing, 726 Pine St., Green Bay, WI 54301; Chuck, (920) 494-1233 or Terry, (920) 469-5566

Revolution Raceway, Memorial Mall, 3347 Kohler Memorial Dr., #D2; Sheboygan, WI 53081; (920) 452-0801 or (800) 594-9420

R.J.S./R.C., 4920 Hwy 70W, Eagle River, WI 54521; Randy Stys, (715) 479-2541

Templestowe Flat Track Racers, Templestowe Reserve, corner of Porter St. and Williamsons Rd., Templestowe, Melbourne, Victoria 31066; Renato Benci, 61 (3) 9553 4625

S&N's Trackside Hobbies and Raceway, 6045 N. Green Bay Ave., Milwaukee, WI 53209; Scott Ernst, (414) 351-1910

WYOMING

Collectable Creations Off-Road Oval Track, 1790 Dell Range Blvd., Cheyenne, WY 82009; Phil Severson, (307) 632-2156

Wind River R/C Racing Association, 113 S. 3rd E., Riverton, WY 82501; Bob Belding, (307) 857-2068

Xtreme Hobbies Raceway, 2724 Powder Basin, Gillette, WY 82718; Krieg Balls, (307) 682-6077

ARGENTINA

Circuit M.R. Models, Av. Av. Monroe 1402, (1428) Capital Federal, Camino del Buen Ayre y Pte. Debedetti, Buenos Aires, Maximiliano, 54-011-47801677

Club A. Velez Sarfield, Av. J.B. Justo 9000, C.P. 1408, Buenos Aires; Jorge Herrero, 54-01-658-5851

AUSTRALIA

A.C.T. Model Car Racing Club, Off-road track—Wanniassa Raceway, Hyland Place, Wanniassa A.C.T.; indoor track—Epic Complex, Northbourne Ave., Canberra North A.C.T.; Gary Davey, 61-6-2871411

A.C.T. Remote Control Car Club, Jenke Circuit, Kambah, Australian Capital Territory; Rob Jorgensen, 61-2-6231-9925; email: sxs@dynamite.com.au

Aubry R/C Car Club, Aubry Showgrounds, Aubry, NSW 2640; Ron Langman, 060-247-128

Canberra Off-Road Model Car Club, Goyder St., Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070

Carine R/C Model Car Club Inc., Penistone Reserve, Greenwood, Western Australia; David Werner, 61-418-922-966

Central Coast ORRC, EDSACC Sports Complex, Bateau Bay, NSW 2261; Peter J. Knight, 61-43-693-698

Fast n' Fun, 250 Potreath Rd., Bellbrae West, Torquay, VIC 3228; Stephen Charr, 613 5266 1550 or 613 5266 1556; fax 613 5266 1556

Illawarra RCECC, Croome Sporting Complex, Albion Park Rail, NSW 2527; Mel or Andrew, 042-714-683

Lakeside R/C Racing Car Club, Hollywood Rd., Lansvale, NSW 2166; R. Bartolozzi, 62-2-907-9800

Melton Electric Circuit Car Association, Safetyway Car Park, corner High St. and Coburns Rd., Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805

Northern Districts Model Rally Club, Inc., Rear Stanford Centre, 16 Stanford Way, Malaga, Western Australia 6066; G. Thirlwell, 61 (9) 249 3855; fax 61 (9) 249 4778; email tony@ois.com.au

Penfield Park, DSTO Complex Salibury, Adelaide, South Australia 5108; Trevor Unsworth, 618 8289-5010

R.C. Speedway, 259 King St., Newcastle, NSW 2300; Andrew Dillon-Smith, 02-49265966

Templestowe Flat Track Racers, Templestowe Reserve, corner of Porter St. and Williamsons Rd., Templestowe, Melbourne, Victoria 31066; Renato Benci, 61 (3) 9553 4625

Wee Waa's Offroad RC, KYEEMA,
Burren Junction, N.S.W. 2386; Shane,
61-02-6796-1339



Wodonga R/C Car Club, 11 Murphy St.,
Wodonga, VIC 3690;
Ron Langman, 61-60-247-128



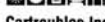
AUSTRIA

RMC-Wien, Aspernstrasse 5, Vienna,
A-1220; Herbert Holze/Martin Hrzak,
+43-664-4730376



BELGIUM

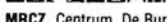
ATR-Alka-Tele-Racing, 3570
Stationstraat 21, Alken Limburg;
0032-11-25-49-03



Cartroubles Indoor Buggy Track,
Jan Moonsstraat 52-56, 2160
Wommelgem; Guy Ermes,
32-3-326-51-15; fax 32-3-326-51-01



MBV-Kampenhout, Teniersln 28,
Kampenhout B1910; Frank Mostrey,
phone/fax 0-16-65-75-18



MRCZ, Centrum, De Burg; Montie,
75-71-63



Model Racing Club Oudenaarde,
Scheldepark, 9700 Oudenaarde;
A. Chanterie, 32-55-31-36-48; fax
32-55-30-19-12



R.C.R., Peilstraat 43, Retie 2470;
A. Eelen, phone/fax 32-14-379685



BRAZIL

Amoc Cassociacao de Modelismo B.
Camborio, Junto ao Par Que Ecologico
de Bal. Camborio, Bal. Camborio, S.C.
88.330-000; Leo Cesar, (047) 366-0001



Brasilia R/C Motor Circuit,
Estacionamento do Estadio Mane
Guarrincha, Brasilia, DF 70000;
Alexandre (Alex), 55-061-273-7205



**C.A.A.R. Curitiba Associacao de
Automodelismo Radiocontrolado,**
Rua Theodoro Makioka,
2300 Santa Candida, Curitiba,
PR 82650-530;
Ronaldo Assumpcao, 55-41-354-2804



Electric Car Club R/C Santos,
Av. Bernardino de Campos, 227,
Santos, SP 11065-001;
Estevam or Arnaldo, 55-013-232-2536



Hamilton Neto Associacao RC, Rua
Uterere 259, Curitiba, Paran 80380-
400; Danico Pilhax, 55-41-338-8041;
hammer_usa@hotmail.com



Hobby Center, SQS 210 BI.H
Apt. 204, Brasilia, DF 70.273;
061-242-0488



Hobby Planet Racing Club, Rod Dom
Pedro 1, KM 1315, Campinas, Sao
Paulo 13091901; Daniel, Helio,
Luciano, 019 258 2768



Jungle Drive, Rua Alberto Maranhao,
No. 219 Icha do Gov. Rio de Janeiro,
21940-490; Paulo Brito,
(021) 396-0851 or (021) 393-7449



MP Raceway, Av. Nacoes Unidas, 6815
Lapa, Sao Paulo; Gerd Heitrotter, 55-
11-9819039; www.hpraceway.com.br



Off Roaders, Av. Guillerme Dummont
Villars, 317, Sao Paulo, CEP 05640;
Waldir Ielpo, (055) 011-260-5628;
fax (055) 011-831-4931



Way of R/C Off-Road Cerrado, Rua
Paraiba 1323, 1st floor, Belo Horizonte,
Minas Gerais; Claudio T. Corrae, (031)
227-6111, fax (031) 227-6869



CANADA

Action Weelz, 462 Turcotte, Vanier,
Quebec, G1M 1R6; Regent Tardif, (418)
527-5756.



Advance R/C Raceway, 4181 Sheppard
Ave. E., Scarborough, Ontario M1S
1T3;
Albert Lau, (446) 321-8377



The All New R.C. World, 2633 Hwy.
#6, Mt. Hope, Hamilton, Ontario L0R
1W0; Dave, (905) 765-2301, Larry,
(905) 333-3297 or Brian,
(519) 752-0044



ATN, Auto Teleguide Nicolet, 2000 Rue
Paul Hubert, Saint-Jean-Baptiste-de-
Nicolet, Quebec J3T 1E5; Louis Durand,
(819) 293-6097



Auto Sprint, 6065 Des Grands Prairies,
St. Leonard, Quebec H3G 2R6; David
Kalayjian, (514) 287-3503



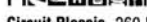
Blew Bye You Raceway, 134 Dike Rd.,
Chilliwack, British Columbia V2P 5B1;
(604) 792-8978



Circuit J.C., 1283 Chemin, St. Philippe,
St. Polycarpe, Quebec J0P 1X0;
Jean Castellon, (514) 265-3675



Circuit Pepsi, Centre de Location, 37
duRoi, Sorel, Quebec; (514) 746-8828



Circuit Plessis, 260 Rang 9 Ouest,
Plessisville, Quebec G6L 2Y2;
(819) 362-3743



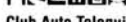
Circuit R/C Pro, 1500 Chemin Sullivan,
Val d'Or, Quebec; J9P 1M1; R/C
Modeler Plus, (819) 874-3918



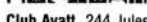
Circuit Teleguide St. Roch, 363-B St.
Charles, St. Roch de L'achigan, Quebec
J0K 3H0; (514) 588-4254,
fax (514) 588-6554



Circuit Teleguide Grand Prix II, 701,
Sainte-Rose, Ste. 200, Laprairie,
Quebec, J5R 1Z2; (450) 444-1286



Club Auto Teleguides, 1750 Mlee
Interprovincie, C.P. 35, Pointe-Fortune,
Quebec, J0P1N0; Jacques St. Alevis,
(514) 451-0078



Club Avatt, 244 Jules-Richard,
Deauville, Quebec J1N 3;
Daniel Vanier, (819) 864-6262



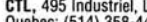
Club RCSI, 44 Rue Holliday, Sept-les,
Quebec G4R; Sylvio Gerard,
(418) 968-6575; Hobby Shop,
(418) 962-6565



CRCCC, Box 309, Clinton, Ontario NOM
1L0; Eric Russell, (519) 482-9429



CTG, 450 Chemin de la Grand Ligne,
Granby, Quebec; (514) 358-4419



CTL, 495 Industriel, Longueuil,
Quebec; (514) 358-4419



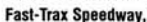
Dustkickers R/C Raceway, 1785
Cypress Rd., Quesnel, British Columbia
V2J 4B1;
Darrell Dinsdale, (250) 747-2680



Dynamic Hobbies, 21 Concourse Gate,
Unit 6, Nepean, Ontario K2E7S4; Clark
Freeman, (613) 225-9634



East Coast Model Center Raceway,
13 Glen Stewart Dr., Ste 1, Southport,
Prince Edward Island C1A 8X9;
Gary Stephen, (902) 569-3262



Fast-Trax Speedway, RR 4, Trenton,
Ontario; Russ McPeak, (613) 394-6411



**Fly'n Bryan's Radical Raceway
& Little Shop of Hobbies,** RR #1, Ste.
12, Comp. 49, Chase, British Columbia
VOE 1M0; Bryan Coffey/Dani Potvin,
(604) 955-0669



Gilles Comtois, 1458 Boul. Lafleche,
Bale-Comeau, Quebec G5C 1E1;
(418) 295-1830



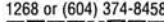
Hobby 2000, 75 St.-Jean-Baptiste, Ste.
140, Chateaugay, Quebec J6J 3H6;
Hogues-Andre Meloche,
(450) 698-2000



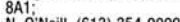
Honda House Motor Speedway, 384
Richmond St., Chatham, Ontario N7M
1P9; John Elliot, (519) 354-5530



Interior R/C Raceway, 34-1605
Summit Dr., Kamloops, BC, V2E 2A5;
Martin Vannieuwenhuizen, (604) 374-
1268 or (604) 374-8458



J-T International Raceway, 127
Milligan Ln., Napanee, Ontario K7R
8A1;



Leading Edge R/C Speedway, 731
Gardiners Rd., Kingston, Ontario
K7M 3Y5; Mike and Tony Daicar,
(613) 389-4878



Mid-Canada R/C Speedway, 216
Hutchings, Winnipeg, Manitoba R3H
0L3; Richard Driedger,
(204) 339-6566



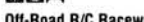
Miniatures & Passions, 204 St. Charles,
#103, Ste. Therese, Quebec J7E 2 B4;
Gilles Lachance, (514) 979-7989



MORRAC Raceway, 6449 Crowchild Tr.
S.W., Box 36060, Calgary, Alberta T3E
7C8; (403) 254-1386



Off-Road R/C Raceway, 76 Eddystone
Ave., North York, Ontario M3N-1H4;
Ron Lefebvre, (416) 740-0536



**Prince George Radio Controlled
Car Club,** 202 Explorer Cres.,
Prince George, B.C. Y2M5R8;
Doug Waller, (604) 561-0035



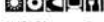
Quintrax Speedway, 610 Dundas St.
East, Belleville, Ontario K7K 2M1;
(613) 962-1414; fax (613) 962-7306



Randy Shantz Raceway, 1015 W. 14th
St., North Vancouver, British Columbia;
Steve Mulhall, (604) 945-3888



R/C Champ Raceway, 670 Progress
Ave., Rear Unit #13-16; Scarborough,
Ontario M1H 3A4; Ben, Matthew or
Louie, (416) 289-8717



Recreation R/C Raceway, Hwy. 16 and
Ferry Ave., Prince George, BC;
Doug Waller, (604) 561-0035



Ronbo's R/C Racing, R.R. 1, Glen
Walter, Cornwall, Ontario K6H 3G4;
Ron Giroux, (613) 936-0176



Roussillon Hobby Track, 177-D St. Jean
Baptiste, Chateaugay, Quebec J6K
3B4; (514) 698-2151



Shadetree Raceway, R.R. #4, 22566
Stage Rd., Thamesville, Ontario;
Darrin Charbonneau, (519) 692-5211



Sney Wreck RC, R.R. #1, St. Regis,
Quebec H0M 1A0; Aimee Mitchell,
(613) 575-2496



**South Muskoka R.C. Track & Mini
Putt,** 8903 Hwy. 11, Orillia, Ontario L3V
6H3; Justin, (705) 329-0397



Spinnin Wheel Raceway, RR 1, Ariss,
Ontario N0B 1B0; (519) 824-1614



South Okanagan Roadhogs, Skha Lake
Rd., Penticton, BC;
Willie Lemm, (604) 492-5698



Steeltown Speedway, 3580 Kirk Rd.
West, Binbrook, Ontario L0R 1C0;
Paul Snyder, (905) 227-7508



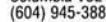
Sudbury Organized Auto Racing,
765 Barrydowne Rd., Sudbury, Ontario
P3A 3T6; Ken Moore, (705) 524-5339



Thunder Alley Raceway, Lambton Mall,
1380 London Rd., Sarnia, Ontario N7S
1P8; Rob Smith, (519) 882-3361



Vancouver R/C Road Racers, #100-
2733 Barney Hwy., Coquitlam, British
Columbia V3E1K9; Roger Brown,
(604) 945-3888

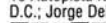


COLOMBIA

Club De Automodelismo Colombiano,
Centro Recreativo Cafam, Kilometro 14
Autopista Norte, Santafe De Bogota,
D.C.; Jorge Delgado,
1-6130588



Club De Automodelismo Colombiano,
Centro Comercial Guayamaral, Kilometro
16 Autopista Norte, Santafe De Bogota,
D.C.; Jorge Delgado, 1-6130588



Garoso Raceway, Avenida Liberta-
dores con Diagonal Gran Colombia,
Cucuta; Gabriel Rodriguez,
975-751892



CYPRUS

Racing Model Club, Kennedy Ave. N.
42, Nicosia; Andrea Sotiriou, 493186;
fax 493229



DENMARK

Brondby Motor Club, Roskildevej 460
Brondby 2605; Soren Boy Holst,
45-36-472-462



Holstebro R/C Buggy Club, Mozartsvej
7500 Holstebro 2600; Michael Brusholt,
45-97-412-734



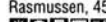
Klub 144 Raceway, Bagsvaerdvej
144A, 2800 Lyngby;
Henrik Carstens, 45-42-88-3691



Rainbow Raceway, Eriksvej 9
Glostrup, Copenhagen 2600;
P. Christiansen, 45-52-848-504



Thor Minirace Odense, Sohusevej 255,
Alleso, Odense, behind Alleso Hallen
(Sport Centre), Odense; Ulrich
Rasmussen, 45-65-303-707



DOMINICAN REP.

Adoca R/C Speedway, Feria Canadara,
Santo Domingo; (809) 220-5266

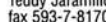


**La Barranquita R/C International
Speedway,** Santiago; (809) 582-2303



ECUADOR

Hobby Centro A.C.R.O. Club,
Via a Turri Km O.S., Cuenca-Ecuador;
Teddy Jaramillo, 593-7-831-289;
fax 593-7-817082



ENGLAND

Chessington Radio Car Club, Surbiton
Sport Club, Riverhill Estate, Worcester
Park Rd., Worcester Park, Surrey; Ian
Spiller, 0252-20657



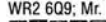
Hampshire Racing Center, Viables
Craft Center, Basingstoke, Hampshire;
Tony Eudola 44-1276-61402



Hinckley RC&C, Three Pots Inn, A5
Wathling St., Hinckley, Leicestershire;
Bruce, 01455-890580



Worcester Model Car Club,
Christopher Whitehead High School,
Bromwich Rd., St. John's, Worcester
WR2 6Q9; Mr. Hardy



FRANCE

Auto Model Club de l'ouest, 45 rue de
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Chris's BACK LOT

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. My email address is: chris@airage.com.

BY CHRIS CHIANELLI

Touring car cometh Men at work ... Boys at play

The touring-car (TC) craze is now so big and so wonderfully out of control that we are now on our fourth special TC issue (look for it soon). Our mission—we have obviously decided to accept, Mr. Phelps—is to clear up some confusion and answer the many questions you guys have been asking about nitro TC racing. I also thought you might enjoy seeing some behind-the-scenes "work in progress" with us editors. Here, we're working on a nine-nitro-TC shootout—a very big feature in the issue. This article includes the very best nitro TC chassis each major manufacturer has to offer.

While we're all contributing to the happy mechanized mayhem, it's Steve "Mr. Science" Pond who's heading up this special issue, so in-depth information is sure to be contained within—after all, I did teach him everything he knows—HAH!

If you like the smell of nitro in the morning (or afternoon, or evening) as I do and want to get all the info and the final word on which touring car you should purchase, don't miss this special issue! Of course, the issue will be filled with "how to" articles on getting the most out of your touring car no matter which one you eventually decide is the one for you.

Here's Kevin "Homer" Hetmanski on gluing detail. Each car had two full sets of tires for the test, so poor Kevin, the new kid on the Air Age block, had 72 tires to glue. Kind of like RC KP duty. He's been happier.



Greg "Screech" Vogel is busy on a Hudy Set-Up Board. Yeah, sure; he knows what he's doing.



"Command Man" Steve Pond checks Kevin's workmanship on those glue joints.



We're ready to go! Yeah ... that's me taking credit for everybody's work.



Speed and acceleration were accurately measured with a Stalker ATS radar gun—the best money can buy. We don't fool around.



Skeeter brought good luck.

Below: teamwork is the key. That's Dana in the foreground on the laptop; she stays calm and keeps things organized while Steve and the boys go over the edge with excitement.

